GARDNER ON REFLEXOLOGY • THE SILVER LAKE SEA SERPENT • DAWKINS'S *UNWEAVING THE RAINBOW*

Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

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JINXED CAREERS?

Superstition and The Regression Effect

The Psychology of the Séance

Dowsing and Archaeology

Is There Something Underneath?

Hidden Messages in DNA?

Joint Pain and Weather

The Real Chief Seattle Was Not a Spiritual Ecologist

Published by the Committee for the Scientific Investigation of Claims of the Paranormal

THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION OF CLAIMS OF THE PARANORMAL

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EDITOR'S NOTE

The Skepticism of Inclusion

As we near the turn of the millennium, the modern skeptical movement has an opportunity to broaden its outreach and appeal.

How? Here are some suggestions:

• Take every opportunity to show that science (and the critical inquiry that is a key part of it) is fun, interesting, positive, challenging, provocative, life-changing, civilization-advancing, awe-inspiring.

• Show that science is open to all new ideas, actively welcomes new evidence and explanatory theories, and loves overturning previously held precepts. It can be revolutionary. Scientists, in fact, are happiest when they are lucky enough to be participating in a true scientific revolution. The only criterion: All new evidence must repeatedly be subjected to, and pass, rigorous testing.

• Emphasize the positive that skepticism is common sense in action; in addition to its crucial role in science, it is a necessary part of everyday life that we all use and embrace. It is not elitist. To the contrary, it is the most democratic of attributes. We all have it and can put it into action on our own behalf. When we kick the tires, check the cash register tape, question ads and commercials, criticize our politicians, we are using native skepticism. Skepticism is self-protective consumerism.

• Forego educational tests for participation. Ph.D.s play a major role in science and in skeptical inquiry, but higher degrees are hardly a requirement to be skeptical. Anyone can participate. The people I've known with the most common sense are those in highly practical occupations such as farmers, ranchers, plumbers, mechanics, builders, pilots, engineers. Wishful thinking plays little role in these fields.

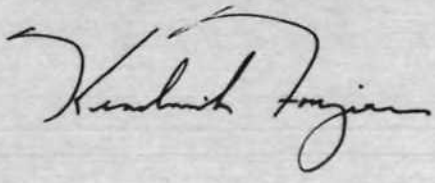
• Forego religious tests. Scientists and skeptics include religious people as well as atheists, and every form, degree, and level of belief or disbelief in between. There are many strong views and opinions about such matters, but they are personal. That's not what science is about.

• Welcome young people to the quest. If dinosaurs, animals, space, and astronomy are ways of exciting young people about learning about the natural world, skeptical inquiry can likewise be used to stimulate young people's critical thinking to go along with their innate curiosity and sense of wonder, which should be everlastingly treasured.

• Welcome more women. Everything possible should be done to involve more women in science and skepticism. Women have long been equal participants with men in all phases of education and professional life, and science and the skeptical movement needs the intelligence, enthusiasm, ideas, experience, and insights of everyone. Minorities also need more encouragement.

• Welcome the activities of skeptical groups at all levels. CSICOP and the SKEPTICAL INQUIRER have helped foster local and regional groups throughout the United States and all over the world. They are independent, and all have their own personalities and different ways of doing things. That diversity should be welcomed, and the wonderful strength and freshness they bring to the skeptical movement capitalized upon.

The skeptical movement can draw strength from our natural love of discovery, people's positive attitudes toward science, the liberating and revolutionary aspects of science, and the welcome involvement of people from widely varying backgrounds and viewpoints. The skepticism of inclusion can bring new strength, vigor, and freshness to the skeptical movement.



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Perspectives on the Media From Hollywood and Academia

Council for Media Integrity conference in Los Angeles explores questions

MATT NISBET AND TOM GENONI

In today's age of information, the media have emerged as perhaps the most powerful influence in society. Feeding what seems an insatiable public appetite for news and entertainment, television, film, radio, newspapers, magazines, and the World Wide Web reach billions worldwide. But in the media's fierce competition to win audiences, stories and reports are sometimes over-simplified, exaggerated, or slanted in ways that make it impossible to reliably sort fact from fiction.

For many scientists and skeptics, distortion of facts and information in media portrayals of the paranormal and pseudoscience has reached critical proportions. Too often in such portrayals mysterious forces eclipse rational explanations, if such explanations are even offered at all. But is there empirical evidence that portrayals of the paranormal really do have an influence on what people believe? Do the media have a responsibility to maintain balanced reporting? Why do the media hype the unexplained while casting science in a negative light? Is there any hope that the situation will change?

These are a few of the questions raised at the conference "That's Entertainment! Hollywood, the Media, and the Supernatural" hosted by CSICOP and the Council for Media Integrity on November 14, 1998, at the Renaissance Hotel in Los Angeles. The conference brought together academics and entertainment-industry insiders who in their own ways have sought to understand the driving forces behind the popularity of the paranormal.

Insiders Blame the Business Side of Hollywood for Sensationalism

Author/entertainer and CSICOP Fellow Steve Allen began the Saturday conference by speaking out against the loss of cultural standards in the media. The erudite creator of the *Tonight Show* charges television and radio with succumbing to vulgarity, a trend he termed the "Howard Stern-ization" of entertainment.

The loss of standards, Allen contends, encroaches on media treatment of science. "Why do so many bright people believe so many dumb things?" asked Allen. He stressed that part of the problem rests with Hollywood writers, who may want to produce intelligent stories

THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION OF CLAIMS OF THE PARANORMAL AND THE COUNCIL FOR MEDIA INTEGRITY PRESENT
THAT'S ENTERTAINMENT!
Hollywood, the Media and the Supernatural

using science but lack the basic knowledge to do so. An Allen commentary on the current state of the American entertainment media was published in the November 13, 1998, *Wall Street Journal.*

Providing the twenty-something Hollywood insider view was Justin Gunn, entertainment reporter and former host of the Sci-Fi Channel's *The Web.* Gunn described himself as one of the few members of his generation who thought it was "hip to be rational" and offered himself as an example that "not everyone in science is a geek."

Addressing Hollywood's need to sensationalize, Gunn said that television producers don't aim to give science short-shrift but are simply reacting to perceived viewer demand and response. In Gunn's view, the paranormal is treated uncritically because sensationalized presentations gain high ratings.

Drawing on his experience as a former producer with the syndicated tabloid television show *Inside Edition,* Gunn said the quest for ratings has blurred the line between hard news and entertainment. He traces the genre of tabloid journalism shows like *Inside Edition* and *A Current Affair* back to the 1988 Hollywood writer's strike, when producers fell in love with easily packaged storylines and programming that streamlined cost and reduced staff size.

With ratings controlling content and few qualified editors available to review reports, the need to generate controversy is paramount regardless of the actual events or facts of a story. Gunn told of one case where aggressive *Inside Edition* television promos touting new evidence of Bigfoot were aired before the story had even been written. The evidence never materialized but the sensational story ran anyway.

Inside Edition's Bigfoot story may never have gained much interest, but the stomp of sensationalism hit audiences heavily in 1995 when the Fox network aired "Alien Autopsy: Fact or Fiction?" The highly rated special featured allegedly real autopsy footage of a space creature found near Roswell, New Mexico. Although many doubts were quickly raised about the film's authenticity, at least one well-respected Hollywood special effects artist gave the footage some credibility. Intrigued and moved to defend the reputation of his profession, Trey Stokes, another special effects artist and a skeptic with a comedic flair, described to conference attendees how he quickly set up a Web site to address the numerous flaws and inconsistencies in the footage. Stokes also polled the opinion of fellow effects artists on the authenticity of the footage, and has yet to find any who support the

Candle in the Dark and Snuffed Candle Awards

Matt Nisbet and Tom Genoni

The Council for Media Integrity held a news conference in Los Angeles November 13 to reward sound science television programming while criticizing paranormal mystery-mongering and superstition on the radio waves. The Council, an international network of scientists concerned with the balanced portrayal of science in the media, honored the producers of the PBS television series *Scientific American Frontiers* for balanced science programming while denouncing radio host Art Bell for perpetuating conspiracy myths and engaging in paranormal mystery mongering.

In presenting the Candle in the Dark Award to *Scientific American Frontiers* producer David Huntley, the Council commended the program for "its outstanding contributions to the public's understanding of science and scientific principles." The series, hosted by Alan Alda, devoted the episode "Beyond Science" to examining claims of pseudoscience and the paranormal from a scientific perspective. Topics included dowsing, palm reading, free energy claims, therapeutic touch, graphology, and the alien autopsy hoax. The episode was repeated on PBS on January 12, 1999.

In comments at the news conference, Council for Media Integrity member and University of California at Berkeley scientist Jere Lipps applauded the *Scientific American Frontiers* series while calling for an increase in science programming on television. Despite polls that show public interest in science at 70 percent, Lipps described television as a "vast wasteland" that misses opportunities to appeal to an audience hungry for scientific information. "Television has little to be proud of when it comes to science, but *Scientific American Frontiers* is one exception. The 'Beyond Science' episode entertainingly displays the scientific process, the thrill of discovery, the sorting of hypotheses, evidential thinking, and critical thinking, all within the the alluring subject matter of the paranormal and pseudoscience."

After receiving the Candle in the Dark award on behalf of *Scientific American Frontiers,* producer Huntley said that he appreciated the recognition and that response to the "Beyond Science" episode from their more than 15 million viewers had been overwhelming. He described the paranormal as a difficult area to explore but hoped that *Scientific American Frontiers* could provide viewers with an exciting behind-the-scenes look at science in action.

Radio host Art Bell, whose program *Coast to Coast AM* is carried by four hundred radio stations across the country, was named recipient of the dubious Snuffed Candle Award. The Council for Media Integrity cited Bell "for encouraging credulity, presenting pseudoscience as genuine, and contributing to the public's lack of understanding of the methods of scientific inquiry." Bell became notorious in 1997 following the Heaven's Gate suicides. On his radio show and his Web site, Bell promoted the notion of a spacecraft following in the tail of the comet Hale-Bopp, possibly contributing to the cult member's suicide in a delusional attempt to "graduate to the next level" aboard the Comet Hale-Bopp spacecraft.

"Bell's show cultivates conspiracy theories, a distrust of scientists, a misunderstanding of science, and belief in suspect, often even demonstrably wrong ideas, concerning everything from astronomy to zoology," said Georgia State University communications professor William Evans. "The radio station managers who carry Art Bell want to pretend that it is merely entertainment programming rather than news or information programming. Bell is thereby given license to offer biased programming with the purposeful exclusion of any voice that might lend criticism to his distorted worldview."

Bell was not in attendance to receive the Snuffed Candle but he did provide the following statement read at the press conference: "A mind should not be so open that the brains fall out, however it should not be so closed that whatever gray matter which does reside may not be reached. On behalf of those with the smallest remaining open aperture, I accept with honor."

To Bell's credit, when he learned of his award, he invited CSICOP Senior Research Fellow Joe Nickell to be the featured guest on his November 19 broadcast. Nickell stayed up late with Bell for the better part of three hours fielding questions ranging from the nature of skepticism to the Shroud of Turin. Response from Bell's audience was overwhelming, with hundreds of e-mail responses filtering in from the CSICOP Web site and close to eight hundred phone calls requesting sample issues of SKEPTICAL INQUIRER.

The Council for Media Integrity, sponsored by CSICOP, was founded in 1996 at the World Skeptics Congress in Buffalo, New York. The Council is a network of prestigious scientists, academics, and members of the media concerned with the balanced portrayal of science. The award titles were inspired by the late Carl Sagan's book, *The Demon-Haunted World: Science as a Candle in the Dark.* Last year's recipient of the Candle in the Dark was Bill Nye for his educational television series *Bill Nye, The Science Guy.* Actor/comedian Dan Aykroyd was given the Snuffed Candle for his pseudo-documentary series *The Psi-Factor.*

alien body as genuine.

Stokes reported that similar alien autopsy videos have since popped up in Canada, Europe, and Argentina, bringing the total of "alien autopsy" films to eight. (A few were produced specifically to demonstrate special effects techniques and one even featured an "alien" available in The Sharper Image catalog.) His article "How to Make An Alien for Autopsy" appeared in the January/February 1996 SKEPTICAL INQUIRER.

Many may remember Peter Bonerz from his role as Jerry on the television series *The Bob Newhart Show* but few probably know of his successful behind-the-scenes career as a television director whose credits include *Friends, Murphy Brown,* and *Home Improvement.* At the conference, Bonerz reflected on his experiences as a skeptic in Hollywood, and how his often cynical take on the changing paranormal fads of Southern California was not always appreciated. (As proof Bonerz cited the under-the-table kicks to his shins he often received from his wife while at dinner parties.)

Bonerz described first-hand experience with the desire among producers to favor mystery over science. A few years ago, Bonerz met with a studio executive to pitch his idea for a movie involving con artists and a UFO. But when the executive learned that the story involved a UFO landing that turned out to be a hoax, the idea was promptly turned down.

Researchers Link Media to Scientific Illiteracy and Paranormal Belief

Moving from entertainment industry members to scientists, Jere Lipps, Professor of Integrative Biology at the University of California at Berkeley, delivered a passionate indictment of the media for promoting scientific illiteracy and superstition. An articulate and outspoken scientist who scuba dives off Antarctica and works with NASA on exobiology, Lipps cited National Research Council statistics that describe 98 percent of Americans as scientifically illiterate. He condemned the media as a major cause. "You can tell when there is too much sex, too much violence on television, but can you tell when there is bad science? No. How could we, when most of us are scientifically illiterate in the field. Television is allowed to run rampant over science."

Though the media may lurk at the root of scientific illiteracy, Lipps also said the media are central to reinvigorating interest in science. Film and television choose to ignore the beauty and excitement of science and scientists, turning a blind eye to a wealth of viable subjects that Lipps described as "creative, inspiring, thrilling, intriguing, and fun." Lipps believes that a drama with scientists as central characters similar to ABC's *ER,* if properly conceived, could be just as dynamic, successful, and entertaining, while inspiring generations of Americans.

Lipps contributed a chapter on the relation between the media and scientific illiteracy in the recently published book *Evolution: Facts and Fallacies,* edited by J.W. Schopf (Academic Press, 1998). For an example of the potential for positive media images of science, visit the popular paleontology Web site at http://www.ucmp.berkeley.edu.

A network drama featuring scientists may be a great way to turn audiences on to science. Television and film, however, have frequently portrayed science and scientists as inhibiting progress, deranged, and villainous. William Evans, communications professor at Georgia State University, studies the treatment of science in popular entertainment media and the effect on public understanding of science. Using video clips and slides to present his own research and that of others, Evans argued that positive portrayals of scientists are rare.

He noted that content analysis revealed scientists to be the occupational group in dramas most likely to kill or be killed. The men and women in lab coats have the most dangerous job on prime-time television. He also described other studies of film and television which reveal that scientists are usually depicted as physically peculiar, socially incompetent, neglectful of family and friends, and unable to initiate or maintain romantic relationships.

And according to Evans, science is portrayed not only as dangerous but as useless in solving problems. Skeptics and scientists are depicted as stubborn, dogmatic, or idiotic and only after they are "removed" from the action can the paranormal danger be eliminated.

More important, according to Evans, these negative presentations of science do appear to affect viewer opinions. For instance, he cited one study that found that habitual television viewers are more likely than infrequent viewers to believe that science is dangerous, that scientists are odd and peculiar people, and that a career in science is undesirable. Evans summarized many of his findings in the January/February 1996 SKEPTICAL INQUIRER. Readers may visit his Web site at http://www2.gsu.edu/~jouwee/evans.html.

Ironically, most complaints from skeptics about the media's uncritical treatment of the paranormal and science are based on subjective opinion and anecdotal evidence. However, research presented at the conference by Purdue University communications professor Glenn Sparks offers preliminary empirical evidence that media portrayals of the paranormal can influence public belief. Sparks, who plans to write a book on the topic, began his research in graduate school at the University of Wisconsin-Madison, where he studied children's reactions to frightening television shows and recognized the common theme of a "paranormal world" in many of the programs.

Prompted in part by articles and mailings from SKEPTICAL INQUIRER condemning the media as the main culprit in the rise in public infatuation with the paranormal, Sparks decided to conduct a literature search on the topic. To Sparks's surprise, he discovered that there had been no published studies on the link between the media and paranormal belief. Intrigued, he conducted a content analysis of three weeks of net-

work programming and discovered that more than 50 percent of television shows from network television mentioned paranormal themes at least once. Drawing on the notion in psychology of the "availability heuristic," that people will draw on information most readily available in their heads, Sparks surmised that increases in uncritical media depictions of the paranormal might lead to increases in paranormal belief.

Over several studies, Sparks has conducted research to test the assumptions about how the "paranormal world" in television and print media can influence beliefs. In one study, Sparks edited an episode of *48 Hours* so that one group of subjects would watch a one-sided report while a second group would watch a more balanced presentation. As expected, subjects viewing the pro-UFO version reported higher beliefs in UFOs while their counterparts reported a decrease.

But Sparks was quick to point out that the results of these studies are sometimes counter-intuitive. For instance, in an experiment involving the use of disclaimers, Sparks found that belief decreased when viewers were told what they were watching was fiction, and increased when no disclaimer was shown. However, belief also decreased when viewers were told "the following story of paranormal activity is based on reported incidents." The presence of any type of disclaimer before a program may in fact trigger a *more* critical reception from audiences.

Although Sparks found other surprising results and cautioned that most were still tentative, he concluded that "media depictions of paranormal events do seem to influence the ways in which people think about paranormal claims." Sparks has published his research in the *Journal of Communication*, the *Journal of Broadcasting and Electronic Media, Communication Reports, Communication Research* and *Communication Quarterly*. Summaries of his research can be found in articles he has published in the Summer 1994 and July/August 1998 issues of SKEPTICAL INQUIRER.

Bringing Good Science to Television, Media

Hollywood insiders Allen, Gunn, Stokes, and Bonerz recommended writing letters of protest to publication editors and news producers when bad science or paranormal hype appears in the media. However, they hedged their advice with a dose of realism, commenting that industry profit motive may be little swayed by viewer outrage.

Scientist Jere Lipps suggested several proactive approaches. He urged scientists to contact television reviewers or offer to write television reviews themselves, issue statements about bad science, provide science stories to television news and newspapers, petition the Television Academy of Arts and Sciences to institute a "Best Science" category, and to lecture and discuss the need for sound media presentations of science with teachers.

Most of all, Lipps would like to see a television drama that features the work and lives of scientists. Several such projects are in the works. The Alfred P. Sloan Foundation has spent $2 million on a program to encourage more thoughtful science programming, with $25,000 going to *NYPD Blue* producer David Milch to initiate a pilot episode based on a scientist-centered drama. The American Association for the Advancement of Science, led by Nobel laureate and CSICOP Fellow Leon Lederman, has been pitching the television networks on a drama series for the past several years.

Evans advocated a "strategic framing" of the science and media question into that of a consumer angle. He suggested that viewers watchdog the media for "bad" science. He also promoted the idea of "positive sensationalism" of science at every opportunity.

Sparks emphasized that further research and publicity surrounding the link between media depictions and paranormal belief is necessary. He also highlighted the lack of research conducted on paranormal beliefs among children. Sparks described children's beliefs as less certain and thus more vulnerable to media promotion of the paranormal and bad science. As a beginning point on this topic, he recommended the recently published book *Mommy, I'm Scared* by Joanne Cantor.

The Los Angeles conference is the latest of the Council for Media Integrity's efforts to proactively work for balanced presentations of science in the media. This summer the Council launched a Web site at http://www.csicop.org/cmi that compiles a schedule of upcoming programming, provides addresses and links for viewer response, archives reviews of past shows, and maintains a database of "media watchdogs" ready to respond to media claims via e-mail.

But the greatest challenge and the greatest opportunity rests with establishing television programming that features scientists and scientific exploration of the paranormal and pseudoscience. CSICOP continues to have ongoing discussions with entertainment industry producers, and promising results may soon be in the future. Stay tuned.

Matt Nisbet is Public Relations Director for CSICOP and Coordinator for the Council for Media Integrity. Tom Genoni is CSICOP West Coast Bureau Chief.

ABC's *20/20* Features Segment on 'Goggle Therapy' for Depression and Anxiety

On October 21, 1998, ABC's *20/20* news magazine program aired a segment entitled "Can taped goggles heal emotional disorders?" The segment was introduced by host Sam Donaldson, who proclaimed goggle therapy as "an amazing medical therapy" and "a breakthrough treatment for depression and anxiety."

As ABC medical correspondent Dr. Timothy Johnson went on to explain, the developer of goggle therapy is Dr. Fredric Schiffer, a psychiatrist at

Boston's McLean Hospital and author of the recently released book, *Of Two Minds: The Revolutionary Science of Dual-Brain Psychology.* The technique of goggle therapy is disarmingly simple: the patient is asked to wear a pair of taped goggles that contains a small opening over either the extreme left or right side. Although some individuals report an increase in anxiety after wearing the goggles, others report a decrease. According to Schiffer, one has to "experiment" to find the correct side on which to place the opening on the goggles, because approximately an equal number of individuals prefer "left-sided" goggles as "right-sided" goggles.

On the show, Dr. Johnson interviewed two patients who reported dramatic improvements in mood after wearing the goggles. With the exception of one sentence ("Some neuroscientists are skeptical"), the *20/20* segment offered virtually no hint that the efficacy of goggle therapy had yet to be demonstrated. In fact, according to Dr. Johnson, Schiffer's results showed that approximately 30 percent of patients "report an intense response" to goggle therapy, "overall about the same response reported with Prozac." Donaldson concluded the segment by encouraging viewers to "try [goggle therapy] at home."

According to Schiffer's book, the rationale underlying goggle therapy derives in part from the research of Richard Davidson and his colleagues at the University of Wisconsin (and that of several other neuroscientists), who have found that the left and right hemispheres of the brain appear to be specialized for positive and negative emotions, respectively. According to Schiffer, the opening in the goggles stimulates the hemisphere on the opposite side of the head, along with this hemisphere's corresponding emotional state. Strangely enough, however, Schiffer's findings concerning the marked differences in left versus right-sided goggle preferences across individuals contradict Davidson's findings, which reveal the same pattern of laterality across virtually all individuals.

After watching the *20/20* segment, I decided to investigate goggle therapy in greater depth. My literature search turned up a total of *one* research article on goggle therapy published in a peer-reviewed journal, one theoretical paper, and two one-page Abstracts (Schiffer has since informed me of another article currently in press). The lone research article on goggle therapy, which was published by Schiffer in the journal *Comprehensive Psychiatry* in 1997, examined seventy psychiatric patients who wore both the goggles developed by Schiffer and a pair of "control" goggles, which permitted monocular vision. Schiffer found that most patients reported changes (either increases or decreases) in anxiety after 45 seconds when wearing the former sets of goggles, but not the control goggles. There was no overall difference in anxiety produced by left-sided versus right-sided goggles, although many preferred one side over the other.

These data are difficult to interpret. First, they say nothing about whether the effects of goggle therapy persist beyond several minutes, let alone days or weeks, and are therefore irrelevant to the therapeutic potential of goggle therapy for depression and anxiety disorders. Schiffer's new book does discuss the long-term effects of goggle therapy, but these reported effects are based entirely on anecdotal and uncontrolled observations. Second, because Schiffer himself elicited reports of emotional changes from patients, and was aware of when patients were wearing the control vs. noncontrol goggles, his findings are potentially attributable to experimenter expectancy (i.e., unintentional cueing) effects. Third, Schiffer's findings may indicate only that obstructing individuals' vision amplifies whatever mood state they are currently experiencing. Because Schiffer has not formally retested his patients to ascertain the stability of their side preferences, it is unknown whether these preferences were systematic or merely random.

The bottom line: goggle therapy remains entirely unsubstantiated as a psychological treatment, and *20/20*'s uncritical promotion of this technique was both scientifically and journalistically questionable. Time will tell whether goggle therapy proves to be a significant advance in the treatment of emotional disorders.

In the meantime, potential consumers of goggle therapy are well advised to recall the dictum that "extraordinary claims require extraordinary evidence." As it currently stands, Schiffer's evidence appears surprisingly unimpressive.

—Scott O. Lilienfeld

Scott O. Lilienfeld is an assistant professor of psychology at Emory University in Atlanta and a SKEPTICAL INQUIRER *consulting editor.*

The Sagan Society of Georgia Celebrates Curiosity and Intellect

Despite their reputation as bastions of learning, colleges and universities aren't immune to fuzzy thinking. At the University of Georgia, the problem has become especially troubling in recent years, most notably with conservative Christian attacks on evolution in the guise of "intelligent design theory." The university has also seen its share of psychic networks, conspiracy theories, and UFO gurus.

This past spring, students and faculty decided to challenge the trend. They formed a group called The Sagan Society, an organization promoting curiosity, rationalism, and skepticism on campus and in the greater Athens, Georgia, community. Its goals include objective inquiry in the spirit of the Enlightenment and better student-faculty interactions through lectures, discussions, field trips, social gatherings

Continued on page 12

Fund for the Future

CSICOP AT THE CENTER FOR INQUIRY

CFI–International
Amherst, N.Y.

1999 PRIORITY

Using the Media & Telecommunications to Promote Science and Reason

The Fund for the Future is a capital campaign to provide CSICOP with the resources needed to more effectively influence media and public opinion. The 90s have been defined by a telecommunications revolution, along with an explosion of misinformation available to the scholar and citizen alike. The hunger for superstition, pseudoscience, the paranormal and miraculous solutions has never been more acute.

THE TEN-YEAR PLAN

CFI–Midwest
Kansas City, Mo.

1999 Contributions are needed for current priorities:

- Increased media appearances by skeptical spokespersons
- Press releases, opinion pieces and media alerts
- Greater exposure through the Internet, including webcasting
- National initiatives coordinated by the Council for Media Integrity
- Instructional materials introducing skepticism to elementary and secondary school students
- Video production

HOW CAN YOU HELP?

CFI–West
Los Angeles, Ca.

CSICOP has established its expertise and integrity. It's time to command more media attention and a larger audience. The Center for Inquiry Fund for the Future is about new methods of outreach and broader influence, and is driven by an ambitious ten-year strategic plan for growth.

We depend on the support of readers and friends to continue leading the international skeptical movement. Gifts to the Fund for the Future provide the resources we need to respond to today's challenges.

All gifts are gratefully accepted. The Fund for the Future welcomes gifts of encouragement and major investments.

Cash contributions and gifts of stock are needed for immediate growth and new initiatives. We also offer a range of planned giving opportunities, from bequests to assorted tax-advantaged trusts and pooled funds. Planned gifts support our work in the future and can provide an income stream for you and a beneficiary. You may also make a gift supporting the general endowment, or establish a special purpose fund underwriting a long-term project that expresses your personal interests and commitment to skepticism.

In today's stock market, gifts of highly appreciated securities offer particular advantages to the donor. When donating stock to a charitable organization, you avoid taxes and maximize the impact of the asset you are donating.

Contact Anthony Battaglia at (716) 636-7571 ext. 311 or via e-mail at CFIANTHONY@AOL.COM to discuss accomplishing your philanthropic and financial goals and contributing to the Fund for the Future.

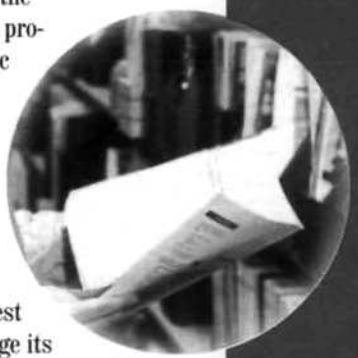
Bill Nye "The Science Guy," Joe Nickell, and entertainer Steve Allen appear on a radio show.

CSICOP
at the Center for Inquiry
P.O. Box 703
Amherst, NY 14226-0703
(716) 636-1425 ext. 311
Fax (716) 636-1733

Co-chairs of the Fund for the Future Campaign: above, author and TV personality Steve Allen; below, author and critic Martin Gardner.

COUNCIL FOR MEDIA INTEGRITY

Formed just weeks after its inclusion in the Ten-Year Plan, the Council for Media Integrity monitors and challenges media programs that convey unfounded claims and mislead the public about science. Members include Steve Allen (co-chair), E. O. Wilson, Stephen Jay Gould, and many others. CSICOP will invest in electronic infrastructure to facilitate rapid response to irresponsible programs.



ENHANCED LIBRARY RESOURCES

The Center for Inquiry's skeptics' library—already the finest of its kind in the world—needs additional funding to enlarge its core collection and add electronic media. Worldwide modem access to the library's catalog is already nearly complete.

ADULT EDUCATION

The Council cosponsors the Center for Inquiry Institute, which has already expanded its offerings to include a new three-year certificate program in science and skepticism. Courses are scheduled in Amherst, Los Angeles, and other cities.

REGIONAL OUTREACH

With the establishment of The Center for Inquiry–West (Los Angeles), The Center for Inquiry–Midwest (Kansas City) and The Center for Inquiry–Rockies (Boulder, Colorado), giant steps have been taken to enhance direct field service to skeptical activists. Additional regional centers are planned, with expanded calendars of activities.

FOCUSING UPON THE YOUNG

To present the skeptical message more compellingly to the young, CSICOP will develop new materials—ranging from age-appropriate print publications to audio and video cassettes and instructional coursework. Goals include enhanced understanding of science and improved critical thinking skills.

and special events. The society also provides local media with expert opinion whenever pseudoscientific claptrap raises its head.

Rationalists and skeptics are too often portrayed as devoid of an emotional or spiritual dimension. The Sagan Society hopes to debunk that myth by celebrating the awesome beauty of the world around us and the power of the human intellect.

So far, the results have been phenomenal. As of this writing, more than 100 people have joined the group, including nonvoting participants from as far away as California and the United Kingdom. The society had a full list of speakers for fall semester including UGA Physics and Astronomy professor J. P. Caillaut *(Extraterrestrial Life—Are We Alone?)*, author Michael Shermer *(Why People Believe Weird Things)*, Atlanta Freethought Society's Edward Buckner *(This Is a Free Country, Not a Christian Nation)*, and UGA's Pulitzer Prize-winning history professor, Edward Larson *(The Religious Beliefs of Scientists)*. Social events include a get-together at the university observatory. Sagan Society vice president Keith Lankford provided in-depth feedback when the daily newspaper highlighted a local dowser. Lankford also publishes the society's newsletter, *Doubting Thomas*.

Sagan Society meetings are designed to stimulate discussion in a nonthreatening atmosphere. The Society seeks to avoid labels such as atheist and humanist, not because it disagrees with those philosophies but because it wants to be an inclusive organization that welcomes various perspectives. Since labels can intimidate people, they're counterproductive. The Society's bottom line is weighing ideas and beliefs against objective, material evidence.

The Sagan Society can serve as a model for similar campus organizations elsewhere. Young people are constantly bombarded by creationism, psychics, astrology, and poor media reporting. Too often this material goes unchallenged. As the problem worsens with millennium fever, what better time to rally students and members of the community-at-large to the banner of rationalism and critical thinking.

As Thomas Jefferson said, "A nation that expects to be ignorant and free, expects what never can or will be."

For more information, visit The Sagan Society at www.uga.edu/dogsbody.

—Barry A. Palevitz

Barry A. Palevitz is a professor of botany and biology, and a faculty advisor to The Sagan Society of the University of Georgia, Athens. E-mail: palevitz@dogwood.botany.uga.edu.

Bennett Braun Case Update: Trials Set for May, July

As reported previously ("Illinois Files Complaint Against Repressed Memory Doctors, SI January/February 1999, pp. 6–7), the Illinois Department of Professional Regulation filed a complaint against psychiatrist Bennett Braun, a leader in the repressed memory movement. On November 9, 1998, the administrative law judge oversaw a pretrial hearing.

Braun filed two more motions. The first again claimed that the Medical Disciplinary Board was biased against him (this time citing a recent *Dateline NBC* story about the case); the judge again denied the motion. In the second motion, Braun asked to have the Burgus family undergo psychological tests. His reasoning was that if they are healthy now, his treatment must have been okay (this ignores the fact that they ceased treatment under Braun in 1992 and have seen other doctors since then). In a telephone interview after the hearing Thomas Glasgow, the lead prosecutor, described this motion as "offensive." Glasgow said it was nothing more than an attempt to "intimidate and bully" the Burgus family into not testifying. This motion was also denied.

Braun did file his answer to the 23-page complaint, essentially denying all charges. His trial is set for May 18 to June 11, 1999.

Earlier, Glasgow had indicated he might modify the complaint to add new information he got from other witnesses. However, because of the complications such a change would bring, he said he will probably not do so at this point.

The previously charged Dr. Elva Poznanski, a child psychiatrist colleague of Braun's, also responded to her complaint, denying the charges while at the same time picking on technicalities in the complaint. Her trial has been set for July 20 to August 13.

The department filed a third complaint relating to the case, this one directed at psychologist Roberta Sachs, who evaluated Pat Burgus and worked with Braun on her case. According to the complaint, Sachs performed an outpatient evaluation of Burgus and determined that she should be admitted to the hospital's Dissociative Disorders Program as soon as possible. Sachs also continued to treat Burgus and recommended that her two sons be admitted as well. The complaint alleges that she did both of these things "without any appropriate or reasonable psychological justification." Many of the charges contained in this complaint are virtual duplicates of those filed against Braun.

Because the charges and witnesses in all three complaints relate to the same case, Glasgow filed a motion to join the three cases, but the administrative law judge denied it. This decision means that the victims, including the emotionally scarred Burgus children, will have to testify three separate times (including at least twice during the school year). Experts will also have to testify three separate times, straining the department's resources during the entire period. The decision seems even stranger considering that the previous civil case filed by Burgus had been joined by a judge for the same reason Glasgow gave in his motion.

So the department will have to pre-

sent essentially the same case three times over. Glasgow, the lead prosecutor in the cases involving Dr. Braun and Dr. Poznanski (another attorney is prosecuting the Sachs case because she is a psychologist, not a doctor), says he has plenty of evidence to present. In a phone interview, he said that people are supposed to be able to trust their doctors, but Braun abused that trust. He called Braun's treatments "re-education" and said his therapy was "more like a North Korean concentration camp than a hospital." He added that "every aspect of their lives was controlled by Dr. Braun and his minions," and it was "almost maniacal in the way this was perpetrated."

—David Bloomberg

David Bloomberg is the chairman of the Rational Examination Association of Lincoln Land (REALL).

Six Psychics Offer Five Scenarios in Murder of JonBenet Ramsey

Any police officer tempted to call in a psychic to help solve a case should have second thoughts after reading a story in the December 29, 1998, issue of the supermarket tabloid the *Globe*. Working from a story claiming that police have used psychics to seek new clues in the JonBenet Ramsey murder, in Boulder, Colorado, the tabloid asked a half dozen well-known psychics for their impressions of the case.

Three psychics said the mother did it, but the three couldn't always agree on the circumstances. Phil Jordan (described by the *Globe* as "a New York psychic praised for his sleuthing ability by police departments") said Patsy Ramsey started strangling her daughter "then finished off with a garrote." Clarisa Bernhardt (who has "worked with police nationwide on missing person cases") said JonBenet was struck "three times with a long, thin, sticklike object." Donna Hankins ("a Pawnee Indian seer" from Las Vegas) said Patsy had been sexually abusing JonBenet.

Psychic John Monti ("who regularly works with police on criminal investigations") said it was a "sex crime" and JonBenet's father, John, was responsible.

Anthony Carr ("a world-famous clairvoyant" from Toronto) said JonBenet's brother, Burke, accidentally struck the girl in the head.

Kathlyn Rhea (who "helped police on more than 90 murder or missing person cases" in 1998, according to the *Globe*) said JonBenet was killed by a pedophile who broke into the house.

Because at least five of the six psychics gave very different descriptions of the murder—and no more than one can be correct—the case illustrates how self-proclaimed seers are quick to implicate innocent people. Police who use psychics are not only draining valuable time, resources, and taxpayer dollars to investigate leads that are probably bogus, they risk casting suspicion on some people who are, more than likely, not guilty.

—C. Eugene Emery Jr.

Gene Emery is a reporter for the Providence Journal. *His e-mail address is gene.emery@prodigy.net.*

Pioneer Balloonist Kittinger Agrees That Dummy Drops Spurred Some Roswell 'Aliens'

Joseph Kittinger, the man who fell to Earth, has reconfirmed, first hand, conclusions presented in the 1997 Air Force report that Air Force drop tests using dummies were probably responsible for some stories of aliens being recovered near Roswell, New Mexico (SKEPTICAL INQUIRER, September/October 1997, May/June 1998).

On August 16, 1960, Kittinger, then a 32-year-old Air Force captain and test pilot, rose in a helium balloon to an altitude of 102,800 feet, nearly 20 miles, and jumped out. One of the "pre-astronauts," he was part of a pioneering program to determine how humans can function in a near-space environment.

As part of the Manhigh, Excelsior, and Stargazer balloon projects, Kittinger made five flights into the stratosphere from 1957 to 1962. Most of the flights took place out of the Air Force base at Roswell. And before people were sent up to jump out of the high-altitude balloons, Kittinger's team tested the concept by dropping into the surrounding desert dozens of lifelike dummies dressed in pressure suits.

In a feature article about Kittinger's career in *USA Today* (August 18, 1998) by reporter Tim Friend, Kittinger described these tests. Then comes this section:

"Kittinger flashes a grin. This project brought him another type of fame. 'We

Anthropomorphic dummy used by the U.S. Air Force in the 1940s and 1950s in balloon projects.

had no idea at the time how this was going to be perceived. But I believe these dummies were the infamous Roswell aliens.'

"On May 21, 1959, one of Kittinger's partners, Capt. Dan Fulgham, was hit in the head by a gondola. 'His face and head swelled up into a grotesque blob,' Kittinger says.

"Kittinger and Fulgham were seen by the public entering the hospital. The Air Force's final Roswell report says that this incident likely accounts for a widely told story of a 'red-haired captain' seen walking an alien 'creature' into a hospital.

"Kittinger quips that, if aliens have visited Earth, they probably didn't get to Roswell unless they were disguised as rubber dummies in flight suits."

—*Kendrick Frazier*

Ken Frazier is Editor of the SKEPTICAL INQUIRER

Cryptozoological Web Sites Bring Out the Animal in Us

In my last News and Comment piece (May/June 1998), I discussed the proliferation of World Wide Web sites on paranormal phenomena. Here I focus on one particular category, "Cryptozoology," indexed by the Yahoo search engine. The number of sites in this category has roughly doubled since my last piece, and there are now more than sixty registered sites. The major categories include Bigfoot (22 sites), Loch Ness Monster (12), and Chupacabra (10), followed by a host of other unusual topics such as Goatmen, Bat Boy, the Altamaha-Ha of Georgia, Nguio Rung (Vietnamese forest people), the elusive Drop Bears from Australia, Storsjon Lake monsters in Sweden, Beasts of Bodmin Moor (large animals said to be in Britain), and the Zuiyo-maru Carcass from New Zealand (supposed by some to be a plesiosaur). In case readers are not familiar with some of the lesser known creatures, Bat Boy is a half-human, half-bat said to have been found in a West Virginia underworld. The Altamaha-Ha is a large, dark water-creature named after the river it frequents, the Altamaha. The local newspaper, *The Darien* [Georgia] *News,* has recorded a number of sightings.

Some of the sites treat the subjects with humor and include lurid photos. Others are clearly unskeptical about the creatures they describe. Luckily for the skeptics, a few sites mention the scientific side of cryptozoology, which is technically the study of newly discovered and rediscovered organisms and hypothetical creatures thought to exist based on the biological clues they leave behind. While the field is famous for controversial beasts such as the Loch Ness Monster, Sasquatch, and Mokele-Mbembe (the supposedly living dinosaur), cryptozoology includes the scientific study of inconspicuous insects and invertebrates.

One scientific example of a cryptozoological find is the okapi, a short-necked giraffe mentioned in 1890 in the book *In Darkest Africa,* but not officially recognized by the scientific community until 1901. The mountain gorilla was reported by an explorer in 1860 but wasn't officially recognized until 1902. Other examples abound.

Cryptozoology also deals with animals that are believed to be extinct, but nevertheless could still roam the earth. Consider the coelacanth, previously thought to be an extinct fish found only in the fossil record, until 1938 when a live specimen was caught off the coast of South Africa.

In the early 1990s, the Vu Quang Nature Reserve in Vietnam was a hotbed of cryptozoological finds. In 1992, a new fish, bird, turtle, and large mammal were found. The large mammal is called the Vu Quang ox, known locally as *Sao La.* Previously, scientists had only found a few horns, skulls, and skin samples. Corroborating this evidence were anecdotal reports from hunters about the Vu Quang ox. In June of 1994, Vietnamese scientists finally captured a five-month-old calf.

The term "cryptozoology" was coined by Bernard Heuvelmans in his personal correspondence to colleagues in the 1950s, after the 1955 French publication of his book *On the Track of Unknown Animals.*

—*Clifford Pickover*

Clifford A. Pickover is author of numerous books on science, mathematics, creativity, and computing. □

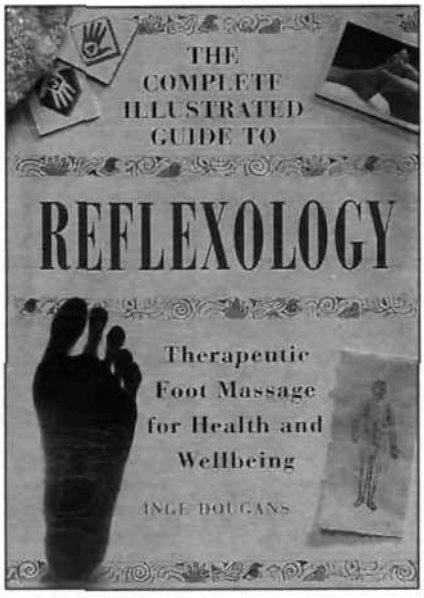
Acupressure, Zone Therapy, and Reflexology

To Stop a Toothache, Squeeze a Toe!

Public infatuation with alternative medicines of all varieties shows no sign of abating. Acupuncture, homeopathy, aromatherapy, herbal remedies, chelation, iridology, therapeutic touch, magnet therapy, psychic healing, and so on, are gaining new converts every day. The tragedies occur, of course, when gullible sufferers rely solely on such remedies and avoid seeking mainstream help. It would be good if we had some statistical evidence about the frequency of deaths following reliance on pseudomedicines.

Reflexology, one of the most preposterous of old alternative therapies now being revived, is the topic of this column. What is reflexology? It is the art of relieving pain and other symptoms of every ailment know to humanity by rubbing and massaging "reflex points" on the feet. I decided to write about it after I picked up a glossy, oversize volume on reflexology in a mall bookstore. It was hard to believe that this book had found a reputable American publisher.

The Complete Illustrated Guide to Reflexology, by Inge Dougans, was published simultaneously in 1996 by Element Books in England and Barnes and Noble in the United States. It is richly illustrated with full color pictures on every page. The back of the book has a glossary of technical terms, a bibliography of earlier books on reflexology and related topics, and two pages listing schools and centers of reflexology around



the world. Ten entries for the United States range from the Foot Relief Awareness Association, in Mission Hills, California, to the Pennsylvania Reflexology Association, in Quakertown.

According to the bookjacket and an inside page, Inge Dougans was born in Denmark where she had her first training in reflexology. In 1983 she founded the International School of Reflexology and Meridian Therapy, headquartered in Johannesburg, South Africa, where she practices. Branches are listed in Brazil, Canada, France, Germany, Italy, Netherlands, Portugal, Sweden, England, and New Jersey. From these centers you can obtain reflexology literature, posters, and a videotape giving a step-by-step guide to the therapy. Dougans also sells what she calls Vacu-Flex Boots. These are felt boots connected to a pump that creates a vacuum around the foot and applies uniform suction over the foot and ankle. Why suction would work as well as or better than air pressure is not made clear.

The origin of reflexology is hazy, but Dougans offers several conjectures. One is that it goes back 5,000 years to ancient China; another that it originated among the Incas who passed it along to Native Americans. Dougans reproduces an ancient Egyptian picture showing a man massaging another man's foot. She thinks this proves that reflexology flourished in ancient Egypt. Evidence for all these theories is nonexistent. What *is* known is that reflexology was a spinoff from a more general therapy called zone therapy that became popular in Europe, Russia, and America in the late nineteenth century.

Zone Therapy (1917), by two physicians, Dr. William Fitzgerald, of St. Francis Hospital, in Hartford, Connecticut, and his associate, Dr. Edwin Bowers, is the classic American treatise on zone therapy. The authors divide the body into ten vertical zones, five on each side, that run like telephone wires from the top of the head to the fingers and toes. Two years later another American, Dr. Joseph Shelby Riley, added two horizontal zones. Riley wrote four books on the therapy, starting with

Zone Therapy Simplified (1919). These zone lines are, of course, as imaginary as the energy lines on acupuncture charts.

In acupuncture, needles are inserted at specific spots on the body. In acupressure, another ancient Chinese therapy—it's a mild form of acupuncture—only pressure is applied at the reflex points. There is little agreement among various schools of acupressure over the precise locations of these points. For a while, in the mid and late 1970s, there was a flurry of interest in acupressure mainly because anyone could apply it to oneself.

In 1976 Lippincott published Yukiko Irwin's book *Shiatzu,* the Japanese term for acupressure. The book rated a full page ad in *The New York Times Book Review* (February 29, 1976). *Cosmopolitan* (August 1975) ran a full-page ad for an illustrated acupressure course. "It works a lot like acupuncture," the ad reads, "only it's so simple, safe, and easy. You learn within minutes what can bring a lifetime of relief." Fifty illnesses are cited, including hemorrhoids, prostate trouble, diabetes, high blood pressure, and constipation—all of which acupressure offers "serious help in healing." If you are seasick, all you need do to make it go away is press a spot on your wrist that the Chinese call the *nei guan* or P6.

In the early 1980s a New York acupressurist named D. S. J. Choy thought of using a strap to apply pressure on P6. It was only a short time until a British firm was selling what it called "sea bands." A plastic button on each band applied pressure to the wrist. In the United States, similar "seasickness bracelets" came on the market, distributed by a firm in Palm Beach, Florida. Tests of these devices were inconclusive. About half of ship passengers said they seemed to diminish their sickness. The other half reported no effects.

Zone therapy was an American version of acupressure, although its pressure points bear little resemblance to those in Chinese and Japanese acupressure. Instead of using needles, or pressure with fingers and thumb, zone therapy used tight rubber bands and spring clothespins to apply pressure. They were fastened on the finger or toe that was joined by a zone to the area where there was pain or some other distress symptom. Zone therapy placed no special emphasis on the feet.

Modern reflexology is that aspect of zone therapy which focuses on the feet. Eunice Ingham, an American who died in 1974, is called by Dougans the "Mother of Modern Reflexology" because she was the first to realize that the foot and its toes have especially sensitive spots for applying pressure. Her research was privately published in two popular books, *Stories the Feet Can Tell Thru Reflexology* (revised, 1938), and its sequel, *Stories the Feet Have Told Thru Reflexology* (revised, 1951).

Correlations of parts of the foot with the rest of the body, Dougans writes, "are similar to correlations with spots on the iris of the eye, the ear, and the hands." However, "corresponding areas of the feet are easier to locate because they cover a larger area and are more specific, rendering them easier to work on."

In today's reflexology the zones of zone therapy are replaced by twelve "meridians" along which a mysterious form of energy the Chinese call *ch'i* flows. Dougans, following the acupuncturists, likes to call it "yin and yang energy." She relates it to energy from sunspots, which she maintains have a strong influence on health. Peaks of sunspot activity, she says, correlate with epidemics such as Europe's Black Death and major flu outbreaks.

Dougans also discusses the influence of Earth's magnetic field on the mentally ill. Because the Moon affects tides, and the human body is 75 percent water, Dougans reasons that it is easy to understand why a full moon affects "arson, kleptomania, destructive driving, homicidal alcoholism," and other forms of psychotic behavior. As readers of the SKEPTICAL INQUIRER know, numerous careful studies have shown that full moons have no such effects, in spite of the contrary opinions of many nurses.

Colorful charts in Dougan's big book identify scores of pressure points along the toes, and on the sole and sides of the feet. The big toe, for example, has spots that lie on meridians to the hypothalamus, brain, mastoid, spine, and pituitary gland. The second and third toes connect to the eyes. The third and little toes join the ear. However, the tips of all five toes are on meridians leading to the sinus and teeth: "incisors on the big toe, incisors and canine teeth on the second toes; premolars on the third toes; molars on the fourth toe; wisdom teeth on the fifth toe." The shoulder, heart, and lungs have pressure points along the ball of the sole. A point on the heel is connected to the sciatic nerve. And so on.

Dozens of pages display striking pictures showing just how the thumb and fingers apply pressure to reflex points to relieve pain and other symptoms. Reflexology will not cure the causes of such terminal ills as cancer and AIDS, Dougans tells us, but it will ease the pain associated with such ills. Moreover, reflexology, if regularly practiced, will prevent the onslaught of such diseases. You can work on your own feet, as the book explains, but for best results, Dougans insists, you must go to a trained reflexologist. Treatments may take weeks or even months, and some patients respond better than others. Do the officials of Barnes and Noble buy all this balderdash? Of course not! The only thing they believe in is profitology.

I own a rare little book titled *Zone Therapy, or Relieving Pain and Sickness By Nerve Pressure* (1928). The author, Benedict Lust, is a prolific writer who is considered the father of American naturopathy. One of his many books is a profusely illustrated *Universal Naturopathic Encyclopedia.* It has 1,416 pages. Lust ran the American School of Naturopathy and Chiropractic, at 236 East 35th Street, New York City. The school published a periodical, *Nature's Path,* devoted to ways of healing without having to see a physician. In later years Bernarr Macfadden, with his *Physical Culture* magazine and his many books, including a five-volume *Encyclopedia of Physical Culture,* became the nation's top promoter of naturopathy.

Lust follows Dr. Fitzgerald in using elastic bands and spring clothespins to apply pressure on fingers and toes. To prevent falling hair he recommends "rubbing the fingernails of both hands briskly one against the other in a lateral motion,

for three or four minutes at a time, at intervals throughout the day. This stimulates nutrition in all the zones, and brings about a better circulation of the entire body, which naturally is reflected in the circulation of the scalp itself."

Amazingly, reflexology is enjoying a mild revival. In my small home town of Hendersonville, North Carolina, a woman reflexologist was favorably interviewed recently by our local newspaper. The March 29, 1998, issue of *Parade*, the Sunday newspaper supplement, ran a half-page ad for a video titled *Reflexology: The Timeless Art of Self Healing*. Your $22.96 also gets you a free wallet-size reflexology chart.

"Pinch your toes to relieve your sinuses?" the *Parade* ad asks. "Press your heel to ease sciatica? Massage the sole of your foot to quiet a nervous stomach? . . . According to those who practice reflexology, the soles of your feet are maps of your entire body. They contain thousands of tiny nerves called 'reflexes' which correspond to every organ, gland, and bodily function. By pressing or massaging these specific points . . . you can revitalize and balance your body's energy, promote natural healing, and more. Now renowned Reflexologist Ann Gillanders tells you just how beneficial it can be with this easy-to-follow video!"

A more recent ad in *Parade* (January 3, 1999) manages to combine reflexology, acupressure, and magnet therapy. For $12.90 you can buy a pair of "Therasoles." These are described as "magnetic acupressure shoe insoles." Each Therasole has over 500 "acupressure nubs" designed to "stimulate the nerve endings in your feet that correlate to all parts of your body." As an extra bonus, each Therasole contains five "strategically placed" magnetic disks. Has *Parade* no shame?

Although reflexology is usually confined to working with pressure on the feet, recent claims have been made for healing by pressure and massage on the hand. In the late 1970s and early 1980s *The National Enquirer* and other tabloids ran full-page ads, even double spreads (December 20, 1977, for example), for a book by Mildred Carter titled *Hand Reflexology: Key To Perfect Health*. The ads were headed in large type: "Now! Let me show you how hand reflexology can bring you instant relief from pains all over the body. . . . Cure specific ailments! Simple method requires no expense . . . no special equipment (just your hands) . . . Can be used by anyone in perfect safety!"

"Yes, Dear friend," the ad begins, "I want to tell you about a method that can stop pain in all parts of the body instantly. . . . No matter what sort of ailment you suffer, merely by pressing or rubbing certain relief centers in your hands, you can absolutely relieve the pain, and in most cases, relieve a cause!" A chart shows the hand's pressure points. Testimonials of miraculous healing, taken from Carter's book, are even more sensational than those at the back of Mary Baker Eddy's *Science and Health*.

A lady of forty-five, deaf since age six, heard normally after twenty minutes of hand rubbing. A uterine fibroid vanished instantly. Bronchial asthma and a painful stomach ulcer were cured in five minutes. Carter says she brought her senile mother, aged eighty-six, back to normal by rubbing her hand. A gall bladder pain instantly disappeared. Carter claims instant healing of hangovers, hemorrhoidal pain, toothaches, impaired vision, prostate trouble, and multiple sclerosis. A cataract's growth was halted. The list of such cures goes on and on. A photograph in the ad shows a man stopping his falling hair by rubbing his fingernails together in precisely the manner prescribed by Lust.

On October 26, 1980, the prestigious *New York Times Book Review* ran a full-page ad for a new variant of acupressure called "myotherapy." This unusual therapy was discovered and named by Bonnie Prudden, head of the Myotherapy Institute, in Stockbridge, Massachusetts. She is identified as a "world famous physical fitness expert" who ran a television exercise program. The ad says she discovered myotherapy in 1976 while working with a Dr. Desmond Tivy in the field of "trigger point injection therapy," whatever that is.

Bonnie's ad has a long list of chronic pains that are erased by pressure on what she calls the body's "trigger points." Unlike acupuncture, acupressure, zone therapy, and reflexology, each person has a different "map" of trigger points. Her book *Pain Erasure: The Bonnie Prudden Way* (New York, N.Y., M. Evans and Company) explains how to locate your trigger points by applying pressure on your body at various spots until you feel a sharp pain. Apparently myotherapy never caught on.

A cartoon I clipped from *Argosy* (June 1974) shows a doctor speaking across his desk to a patient. "Orthodox medicine has no known cure for your condition," he is saying. "Fortunately for you, I'm a quack." □

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The Silver Lake Serpent
Inflated Monster or Inflated Tale?

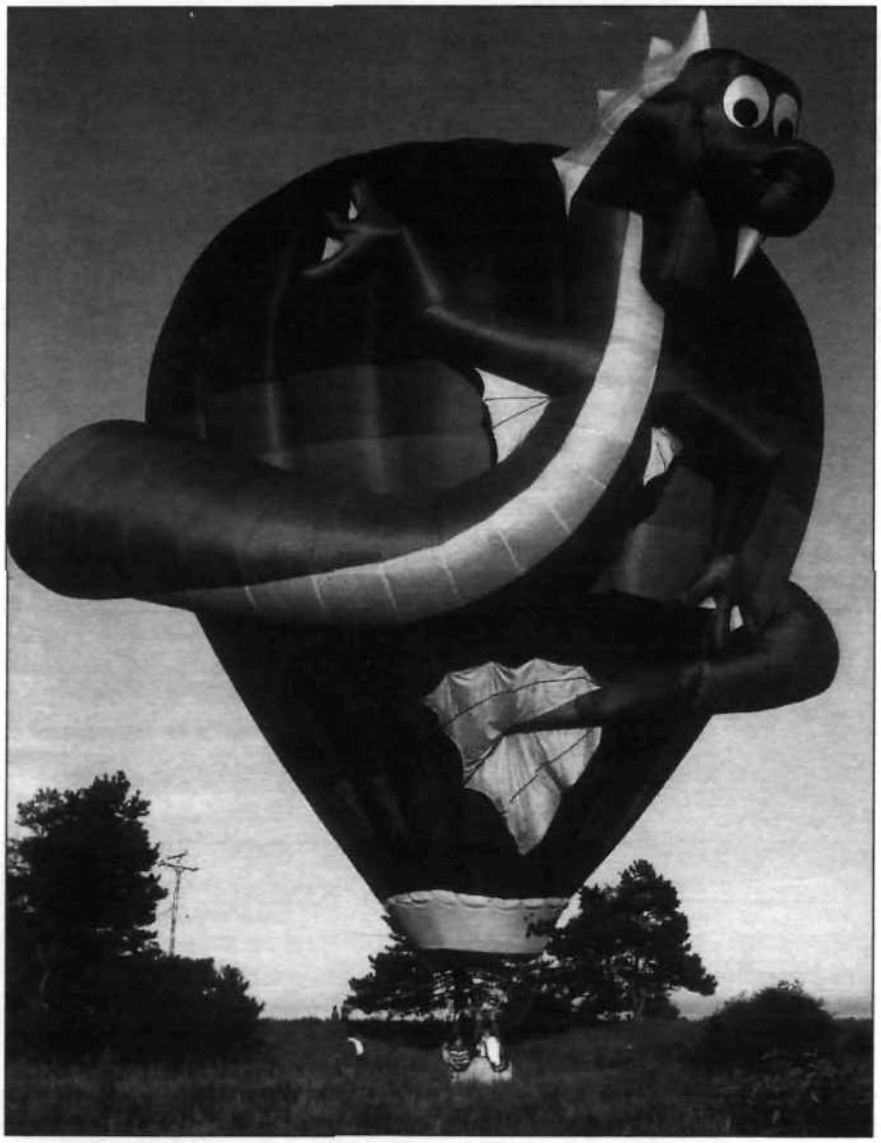

Figure 1. Hot-air balloon at the 1998 Silver Lake Serpent Festival, Perry, New York. (Author shown in white shirt)

On the night of July 13, 1855, in Wyoming County, New York, two boys and five men were fishing from a boat on Silver Lake near the village of Perry. After several minutes of watching a floating log, one man exclaimed, "Boys, that thing is moving!" Indeed, according to the *Wyoming Times,* after bobbing in and out of sight, suddenly, "the SERPENT, for now there was no mistaking its character, darted from the water about four feet from the stern of the boat, close by the rudder-paddle, the head and forward part of the monster rising above the surface of the water. . . . All in the boat had a fair view of the creature, and concur in representing it as a most horrid and repulsive looking monster" (Silver Lake serpent 1855).

Soon, others were reporting sightings, and excitement spread far and wide. As reported in an 1880 pamphlet, *The Silver Lake Serpent,* "People came on foot, by carriage, on horseback, and in fact, by any means of locomotion in their power, to see if even a glimpse of the monster could be obtained, and the hotels found they had 'struck a bonanza'" (p. 3). Several expeditions were launched—ranging from a whaleman with a harpoon to a vigilance society of men armed with guns to a company having a capital stock of one thousand dollars and bent on cap-

Joe Nickell, CSICOP's Senior Research Fellow, is author of sixteen investigative books.

turing the creature (*Silver Lake Serpent* 1880, 3–21).

This was all to no avail, and the excitement eventually died down. Then, reports a modern account: "Several years later [1857] a fire broke out in the Walker Hotel. Firemen rushed to the scene to put out the blaze. When they worked their way into the attic they came upon a strange sight. In the midst of the flames they saw a great green serpent made of canvas and coiled wire" (*Legend* 1984, 11). States another source: "The truth was then revealed by Mr. Walker himself" who "built that monster serpent with his friends to pick up the business at the Walker House Hotel" ("True" 1974).

Mr. Walker was Artemus B. Walker (1813–1889), and the scheme attributed to him and "a few of his intimate and trustworthy friends" is described in a local history by Frank D. Roberts in 1915:

> The serpent was to be constructed of a body about 60 feet long, covered with a waterproof canvas supported on the inside by coiled wire. A trench was to be dug and gas pipe laid from the basement of a shanty situated on the west side of the lake, to the lake shore. A large pair of bellows such as were used in a blacksmith shop, secreted in the basement of the shanty connected to that end of the pipe, and a small light rubber hose from the lake end to the serpent. The body was to be painted a deep green color, with bright yellow spots added to give it a more hideous appearance. Eyes and mouth were to be colored a bright red. The plan of manipulating the serpent was simple. It was to be taken out and sunk in the lake, and then when everything was ready, the bellows were to be operated and air forced into the serpent, which naturally would cause it to rise to the surface. Weights were to be attached to different portions of the body to insure its sinking as the air was allowed to escape. Three ropes were to be attached to the forward portion of the body, one extending to the shore where the ice house now stands; one across the lake, and the other to the marsh at the north end; the serpent to be propelled in any direction by the aid of these ropes [Roberts 1915, 200–201].

Roberts adds that "Many nights were spent" in the construction of the creature, after which it was transported to the lake one night and sunk at a depth of some twenty feet. Then came Friday evening, July 13, 1855, and—you know the rest of the tale. Today, Perry's city limits signs sport a sea monster, and the town annually hosts a lighthearted Silver Lake Serpent festival—most recently featuring hot-air balloons. (One of these was an inflated sea serpent in which I flew over the scenic lake and countryside. See Figures 1 and 2.)

The hoax story is a colorful yarn, but is it true? It has certainly been reported as factual even by writers inclined to promote mysterious monsters—providing a touch of skepticism that seemed to enhance those writers' credibility. For example John Keel's *Strange Creatures from Time and Space* (1970, 260–261) claims the case proves "that a sea serpent hoax is possible and was possible even in the year 1855." Keel (260) also claims that "witnesses generally gave a very accurate description of what they had seen." He is echoed by Roy P. Mackal whose *Searching for Hidden Animals* (1980, 209) specifically states that the Silver Lake creature was "described as . . . shiny, dark green with yellow spots, and having flaming red eyes and a mouth and huge fins." Other sources follow suit, including the *History of Northwestern New York,* which states that watchers "beheld a long green body, covered with yellow spots . . . and a large mouth, the interior of which was bright red" (Douglass 1947, 562). Alas, these writers are merely assuming people saw what Roberts's description of the fake serpent indicates they should have seen. In fact, not one of the original eyewitness reports mentions the yellow spots or the red mouth.

Among the problems with the hoax story is that—although wonderfully skeptical—it exists in a suspicious number of often-contradictory variants. For example, whereas Roberts's previously cited account of the hoax's discovery refers to a wire-and-canvas monster being found by firemen in the hotel attic, other sources give a very different explanation, stating that "in the debris left by the fire were found the remains of the Silver Lake Monster" (Mackal 1980, 209), specifically "the frame of the serpent" (Silver Lake Serpent Revived n.d.) or maybe just "remnants of wire and green canvas" (Fielding 1998).

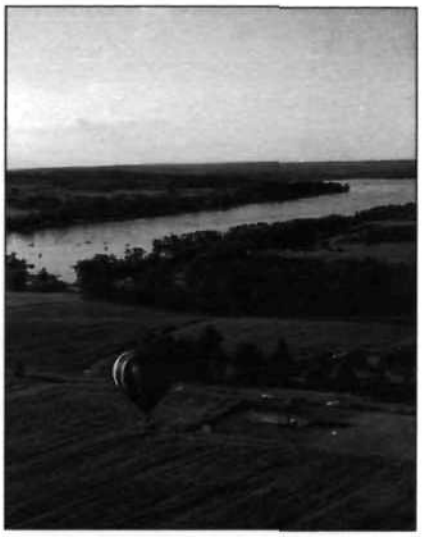

Figure 2. Balloon's-eye view of Silver Lake, Wyoming County, New York, site of 1855 lake monster sightings. (Photo by Joe Nickell)

At least one source asserts that "The creators of this stupendous hoax soon afterward confessed" (Peace 1976), and monster hunter Mackal (1980, 209) names the "confessed" perpetrators as Walker and *Wyoming Times* editor Truman S. Gillett. However, one writer attributes the newspaper's alleged involvement to "rumor" (Kimiecik 1988, 10), and a long-time local researcher, Clark Rice, insists that Walker was only *suspected* and that "No one ever admitted to helping him" (Fielding 1998).

Due to the many variations the story is appropriately described as a "legend," "tale," or even "the leading bit of folklore of Perry and Silver Lake" (*Perry* 1976, 145). States Rice: "It was a subject that was bantered around when you were growing up, and everyone had a different version" (Vogel 1995).

A Hoax?

Invariably the books and articles that give a source for the tale cite Frank D. Roberts's previously quoted account. Writing in 1915, sixty years after the alleged hoax, Roberts gives no specific source or documentation, instead relying on a fuzzy, passive-voice grammatical construction to say, " . . . to the late

Figure 3. Author with bellows (probably a blacksmith's) allegedly used to inflate a fake rubber serpent as part of an elaborate hoax.

A. B. Walker *is credited* the plan of creating the Silver Lake sea serpent" (emphasis added) having supposedly been assisted by "a few of his intimate and trustworthy friends"—who, alas, remain unnamed. He adds, "*It is said that* the serpent was made in the old Chapin tannery" (emphasis added), further indication that Roberts is reporting rumor (Roberts 1915; 200, 202).

The elaborateness of the literally monstrous 1855 mechanism raises further suspicion about the tale. Never mind the alleged laying of the "gas pipe," when gas lines did not come to Perry until 1909 nor piped water until 1896 (*Perry* 1976, 119, 124), raising questions about the availability of the pipe. And never mind the "small light rubber hose" that reportedly extended from shore to serpent, when the availability of that seems equally doubtful in a mid-nineteenth-century village. There *is* a large old bellows, attributed to the hoax, that is displayed in the Pioneer Museum at Perry (see Figure 3), but its display card states only that it is "*believed* to have been used to inflate the Silver Lake sea serpent" (emphasis added).

Materials aside, the complexity of the alleged contraption as described by Roberts provokes skepticism. Although such a monster would not seem to preclude the laws of physics (Pickett 1998), the propulsion method Roberts describes raises serious questions. The three ropes that were reportedly attached to the serpent and extended to three lakeside sites would have greatly complicated the operation, not to mention multiplying the danger of detection.

Indeed, the Silver Lake contrivance would seem to have been a rather remarkable engineering feat—especially for a hotelier and some village friends. One suspects they would have sewed a lot of canvas and made many experiments before achieving a workable monster, yet Roberts (1915, 202) claims theirs worked on the first attempt. In fact, over the years attempts to replicate the elaborate monster have failed (Fielding 1998; Peace 1976).

Despite the claim that Walker created the serpent, 1855 newspaper accounts make clear that there was an earlier Indian tradition about a Silver Lake serpent and that, furthermore, such a monster had been "repeatedly seen during the past thirty years" (Silver Lake Serpent 1855). Certainly, not all of the 1855 sightings can be explained by the monster contraption Roberts described. According to his account it was installed near the northern end of the lake, where both the inlet and outlet are located. Yet on Thursday, August 16, farmer John Worden and others who were "on the west shore of the lake *between two and three miles above the outlet*" (emphasis added) reportedly sighted "the monster" about a quarter mile distant (Silver Lake serpent 1855). Surely no one imagines the fake monster being controlled from more than two miles away! Neither can the monster apparatus explain sightings of a distinct *pair* of creatures at the same time (*Silver Lake Serpent* 1880, 19–20).

In fact, the earliest version of the hoax tale appeared in the December 12, 1860, *Wyoming County Mirror*. "Everyone remembers," stated the brief article, "that during the Silver Lake snake excitement, at Perry, the hotel there reaped a rich harvest of visitors. A correspondent of the Buffalo Commercial says that when about two years and a half ago, the hotel was partially burned, a certain man discovered the serpent in the hotel." This "was made of India rubber," and supposedly "corresponded minutely" with a *Buffalo Republic* description of the serpent. The man who discovered the rubber fake "has just got mad at the landlord and divulged the secret." The newspaper story ended on a skeptical note: "We suppose this last game is just about as much of a 'sell' as the original snake."

In sum, the historical evidence diminishes as we work backward to the alleged hoax, whereas, conversely, details of the story increase the further they are from the supposed event. Therefore it appears it was the story—rather than the serpent—that became inflated. If Walker and/or others did perpetrate a hoax, it is unlikely to have involved an elaborate contraption such as Roberts described.

There *were* hoaxes associated with the 1855 frenzy but they were largely played out in the newspapers of the day, which treated the whole affair as great sport. For example, in September the *Chicago Times* reported that two visitors had seen the monstrous serpent harpooned and towed to shore. The newspaper jocosely reported that at nightfall the creature uprooted the tree to which it was tethered and returned to the lake. It was recaptured the next day, said the *Times*, whereupon it "awoke, threw its head 60 feet into the air; lurid eyes glared like balls of flame and its tongue, like flashes of forked lightning, 10–12 feet long, vibrated between its open jaws" (Douglass 1955, 119).

Insinuations of hoaxing probably elicited an early statement by *Wyoming Times* editor Gillett. On August 8, 1855, he wrote: "We assert, without fear of contradiction, that there is not a log floating on the water of Silver Lake—that

nothing has been placed there to create the serpent story . . . " and that the paper had published what was related by truthful people (Silver Lake serpent 1855).

Tracking the Monster

Even if there was a hoax (either a fake serpent or a journalistic scheme), that does nothing to explain the earlier sightings. At this late date we can only round up the usual lake-monster suspects. As the perpetual saga at Scotland's Loch Ness demonstrates, "monsters" may be created by floating trees and driftwood, leaping fish, swimming otters and deer, windslicks, and many other culprits—often seen under such illusion-fostering conditions as mirage effects and diminished visibility (Binns 1984). For example, some of the Silver Lake sightings, including the one that launched the 1855 frenzy, occurred at night when visibility would have been relatively poor and imaginations heightened.

Eyewitnesses typically insisted the object was a living creature, sometimes with its head above the water. A possible candidate is the otter, which "when swimming seems a very large creature" (Scott 1815). While treading water, an otter can raise its head and neck well above the surface and otherwise simulate a monstrous serpent, especially if swimming with one or two others in a line (Binns 1984, 186–91). The large North American otter (*Lutra canadensis*) inhabits "virtually the whole of the New World" (Chamin 1985, 6). On one of my visits to Silver Lake, I was startled while walking along a nature trail to glimpse a creature swimming in a nearby stream; it quickly vanished and I was puzzled as to its identity until I later learned that otters had recently been reintroduced there.

I subsequently talked with New York State wildlife experts about otters possibly being mistaken for mid-nineteenth-century "lake serpents." Bruce Penrod, Senior Wildlife Biologist with the Department of Environmental Conservation, stated it was "very probable" that otters were in the Silver Lake area in 1855. And if the sightings were not hoaxes, he said, he would clearly prefer otters—or even muskrats, beavers, or swimming deer—over sea monsters as plausible explanations for such sightings.

His view was echoed by Jon Kopp, Senior Wildlife Technician with the department. Kopp had an illuminating story to tell. In 1994 he was involved in banding ducks and was sequestered in a blind on Lake Alice in Clinton County. It was dark, when suddenly he saw a huge snakelike creature making a sinuous, undulating movement, heading in his direction! As it came quite close he saw that the "serpent" was actually a group of six or seven otters swimming in single file, diving and resurfacing to create the serpentine effect. "After seeing this," Kopp said, "I can understand how people can see a 'sea serpent'" (Kopp 1998).

I thought of otters especially when I studied two previously mentioned accounts of 1855 that described a *pair* of "serpents" estimated at twenty to forty feet in length. Possibly the witnesses in each case saw two or more otters, which, together with their wakes, gave the appearance of much longer creatures. All of the witnesses were observing from considerable distances—in one case through a spy glass (*Silver Lake Serpent* 1880, 19–20)—distances that could easily be overestimated, thus exaggerating the apparent size of the creature. Because otters are "great travelers," with nomadic tendencies (Kopp 1998), it is possible that a group of them came into Silver Lake in the summer of 1855 and later moved on, thus initiating and then ending that particular rash of sightings.

The least likely explanation for the Silver Lake reports is that some exotic creature inhabited its waters. Whatever people did see, the situation was hyped in turn by the local newspaper and the antics of would-be monster hunters. People's expectations were thus heightened and that led in turn to misperceptions. Even the overly credulous paranormalist Rupert T. Gould admitted that people expecting to see something could be misled by anything having a slight resemblance to it. Gould called this tendency "expectant attention" (Binns 1984, 77–78) and it is the basis of many paranormal claims—apparently including sightings of the Silver Lake Serpent, a case of the tale wagging the monster.

Acknowledgments

In addition to those mentioned in the text, I am grateful to Tom Pickett, Department of Physics, University of Southern Indiana; Tammy Miller, Perry Chamber of Commerce; Barbara Henry, Perry Public Library; Tim Binga and Ranjit Sandhu, Center for Inquiry; the staff of the Special Collections Department, Buffalo and Erie County Public Library; and the Inter-Library Loan Department, New York State Library.

References

Binns, Ronald. 1984. *The Loch Ness Mystery Solved.* Buffalo, N.Y.: Prometheus Books.

Chamin, Paul. 1985. *The Natural History of Otters.* New York: Facts on File.

Douglass, Harry S. 1947. "Wyoming County," in John Theodore Horton, et al., History of *Northwestern New York.* New York: Lewis Historical Publishing Co.

———. 1955. The legend of the Serpent: 1855–1955, *Historical Wyoming* 8.4 (July): 115–21.

Fielding, Todd. 1998. It came from Silver Lake, *The Daily News* (Batavia, N.Y.), July 25.

History of Wyoming County, N. Y. 1880. New York: F. W. Beers & Co.

Keel, John A. 1970. *Strange Creatures from Time and Space.* Greenwich, Conn.: Fawcett Publications, 254–9.

Kimiecik, Kathy. 1988. The strange case of the Silver Lake sea serpent, *New York Folklore* 9.2 (Summer): 10–11.

Kopp, Jon. 1998. Interview by author, September 18.

The Legend of the Silver Lake Sea Serpent. [1984.] Silver Lake, New York: Serpent Comics and Print Shop.

Mackal, Roy P. 1980. *Searching for Hidden Animals.* Garden City, N.Y.: Doubleday, 209–10.

Peace, Carolyn. 1976. The Silver Lake sea serpent, *Buffalo Courier-Express,* May 16.

Penrod, Bruce. 1998. Interview by author, September 14.

Perry, New York, As It Was and Is. 1976. Perry, N.Y.: Perry Bicentennial Committee.

Pickett, Thomas J. 1998. Personal communication, September 18.

Roberts, Frank D. 1915. *History of the Town of Perry, New York.* N.P. [Perry, N.Y.]: C. G. Clarke & Son, 184–203.

Scott, Sir Walter. 1815. Letter quoted in Binns 1984, 186–7.

The Silver Lake serpent. 1855. *Wyoming Times,* September 26 (citing earlier issues of July 18–September 19).

The Silver Lake Serpent: A Full Account of the Monster as Seen in the Year 1855. 1880. Castile, N.Y.: Gaines and Terry.

Silver Lake serpent revived for Jaycee festival, undated clipping ca. 1960s, vertical file, Perry Public Library.

"The True and Unembellished Tale of the Great Serpent of Silver Lake," 1974. Song, published in *Legend* 1984, 1.

Vogel, Charity. 1995. Perry recalls fishy tale of sea serpent, *The Buffalo News,* July 22. □

Aliens Menace Arizona and Attack Satellites While the Price of Exorcisms Keeps Rising

Now that Art Bell has safely returned to his all-night "Coast to Coast" radio talk show after his still-unexplained hiatus, the level of space-related paranoia is rising to levels that are, well, astronomical.

Richard Hoagland, one of Bell's perennial favorites, generated tremendous excitement among Bell's listeners with his claim that an alien space probe was due to land near Turret Mountain in central Arizona December 7, 1998 (see http://www.lunaranomalies.com/december_7th.html). It began with widespread reports made on the Internet concerning a supposed extraterrestrial radio signal that was allegedly being received from EQ Pegasi. According to The SETI Institute, this appears to have started as a deliberate prank by someone impersonating a certain SETI (Search for Extraterrestrial Intelligence) researcher (see http://www.seti.org/eqpeg.html). Hoagland somehow determined that the supposed SETI signal portended the imminent landing of an extraterrestrial probe. Hoagland told Art Bell's listeners that he was receiving information about the forthcoming landing from "intelligence community" sources, as well as from "speech reversals" (playing tapes of officials' speeches backwards, which supposedly reveals what people are really saying). Peter Gersten, head of CAUS—Citizens Against UFO Secrecy—sent out a cry for assistance to his members to be ready for the probe's potential arrival, since "CAUS believes we must assume that Dick Hoagland's information, based upon his experience, expertise, and intuition and corroborated by his calculations and Pentagon sources, is reliable and accurate." Gersten reported that "the response was overwhelming." Pilots of small planes were asked to be on the ready in Sedona, Arizona. Hoagland, however, urged caution since "If there is a secret military tunneling operation or an actual 'ET event' is to take place, it may not be safe for you to approach the area," and he speculated that the area would be placed under martial law. Remarkably, December 7 came and went without any unusual discoveries. So far as is known, no unusual military activity took place in the area, and nobody has yet found any ET probe. There was, however, what Hoagland termed "evil weather" in Phoenix on that date, which he speculates "may have actually been induced as part of a 'Hyperdimensional Physics' experiment."

Hoagland determined that the SETI signal portended landing of an extraterrestrial probe.

Robert Sheaffer's World Wide Web page for UFOs and other skeptical subjects is at www.debunker.com.

Linked into Hoagland's Web page is a group called The Millennium Group (http://www.millenngroup.com/orca.html). They are raising the alarm about supposed "new solar system members" being detected by the SOHO solar research satellite. When contact with SOHO was lost last June, there was speculation among UFOlogists that the satellite had spotted something that it wasn't supposed to see, and may have been a victim of "alien attacks" (see http://www.mindspring.com/~what/satellite1.html). One Web site hosted by Citizens Against the New World Order called "CyberSpace Orbit" promoted bizarre explanations for SOHO's demise. It claimed that two weeks earlier a kind of solar flare "seemed to reach out and blind" SOHO's cameras, and also that in another SOHO photo "two strange objects" appeared near the sun. Suddenly, the CyberSpace Orbit Web site 'disappeared' from the Internet. Speculation was rife that the Web site was shut down because "Perhaps too many people are seeing things someone doesn't want them to see." But if the New World Order is censoring Web sites, they are not very good at it, because the supposedly banned information can now be viewed at its new location at http://members.aol.com/phikent/orbit/orbit.html.

Now that SOHO has recovered fully from its "alien attack," it is sending more images, which again contain blurry objects representing solar

phenomena and optical artifacts. One of the supposed new solar system objects has been dubbed "Orca" by The Millennium Group because of the resemblance of its blurry, formless shape to a whale. "The LASCO C3 photo shown above was the very last image before the SOHO/LASCO satellite experienced a 90 day shut down. We are now more confident than ever that the interruption in service of the SOHO/LASCO satellite was done on purpose by the U.S. military/intelligence community to prevent the public from seeing any more of the 'Orca,' or the other new members of our inner Solar System. We also have reason to believe that the DIA, NSC, and/or NSA are working independent of any congressional or administrative authority."

The above, however, gives us only a small hint at the full richness of misinformation to be found by listening to Art Bell. Among the other gems that have been gleaned in the past few months by regular listeners:

A caller in northwest Washington told Bell that he had mysteriously suffered an hour and a half of "missing time." Bell suggested that he be "regressed" by a hypnotist immediately, to check for possible alien abduction. The caller said that he had talked to others who had experienced the same thing at the same time, causing Bell to wonder if perhaps time for everybody might have "slipped" (September 21). A week later, Bell was claiming that hundreds of other people in Seattle had sent him faxes saying that they, too, had experienced "missing time" at this same moment (September 28).

A Dr. Jonathan Reed said he came across an alien while hiking in the woods, causing his dog to implode. In self-defense he struck the creature in the head, and it fell. Believing it to be dead, he wrapped it in a blanket to carry it home, and placed it in his freezer. Three and a half days later, he opened the freezer, and the not-so-dead alien let out a piercing, unearthly scream. Unfortunately, the Men In Black must have gotten word of his amazing discovery, because soon his house was broken into, the intruders removing not only the alien, but the freezer as well. As proof of his story, Reed offers photos of the dead alien, the hovering craft, and even the recorded sound of the creature's scream (November 11).

It turns out that one of the factors making housing so expensive in Northern California these days is the high cost of *feng shui*. According to an Associated Press story October 2, 1998, the real estate development firm Kaufman and Broad incurred an unusual expense in a development in San Jose, in the heart of the Silicon Valley. It paid two practitioners of *feng shui*—the Chinese art of arranging the environment harmoniously—$6,000 to perform a four-hour "seven-star blessing" to cleanse the area of "negative" or "stagnant" energies. Diana Robinson tossed flower petals into the wind, sprinkled water into the air, rang a sacred Balinese bell, and danced around in the dirt. The development needs all the *feng shui* it can get, as excavation of the site revealed a major Native American burial site. So if nothing dreadful happens there, like in the movie *Poltergeist*, it'll be proof that the *feng shui* was successful.

A similar "blessing" was performed at the recent opening of a card club in Colma, California, just south of San Francisco, which is sometimes known as the "city of cemeteries" because its few thousand living inhabitants are far outnumbered by its 1.5 million dead ones. With so much potential bad luck around, how can gamblers be reassured that Lady Luck will not permanently be scared away by all those ghosts? The *San Jose Mercury News* reported July 9, 1998, that a little *feng shui* went a long way toward reassuring the card club's largely Asian-American clientele that the ghosts of so many departed would not harm their chances of making a killing at the tables.

Back in San Jose, something like a ghostbusting service is being operated by the Academy for Psychic Studies. The Reverend Sandy Caven explained to the *San Jose Metro* (October 29, 1998) that "when someone moves into a new home, it's set up for the last person's vibration. It's almost like they've left their furniture behind or their pictures on the wall. We just strip it of the old vibrations, and then people can set it up any way they want." One satisfied customer related how the Academy helped rid her house of "a heavy kind of energy," presumably created by "animosity" and "a lot of fights" with her ex-husband. She reported that a few hours after the ritual ended, at about 3 A.M., she heard noises coming from the kitchen, as if something were rattling the silverware. "I believe it was one of the so-called entities," she said, "leaving the house, taking the bad energy with it." Her next house was in Berkeley, and had previously been occupied by university students. The house was filled with "heavy male energy . . . in the back room, it felt like they had been doing porno stuff." The Academy performed its mumbo-jumbo, and cleared up the problem: "Now when I come home I can say, 'Hello house,' it's all mine. It's comfy, with loving thoughts." What is the secret ingredient that makes the ghostbusting ceremonies so effective? Salt. The Reverend Angela Silva, another ghostbuster, explains that the salt "is a preservative" which "can hold a charge of energy." The psychics, she explains, meditate over the salt and charge it with positive energy. They then sprinkle the salt all over the rooms to be cleansed, much like a carpet deodorant. Best of all, the treatment is "good for 100 years." But nothing this effective comes cheaply. Caven explains that the reason that prices for the ceremony start at $75 per room is "it takes several hours to charge up that much salt." □

A caller in northwest Washington told Art Bell that he had mysteriously suffered an hour and a half of "missing time." Bell suggested that he be "regressed" by a hypnotist immediately.

Superstition and the Regression Effect

Whenever two variables are imperfectly correlated, an extreme value on one is likely to be matched by a less extreme value on the other. People's misunderstanding of this statistical fact results in a variety of superstitious beliefs, from the benign to the pernicious.

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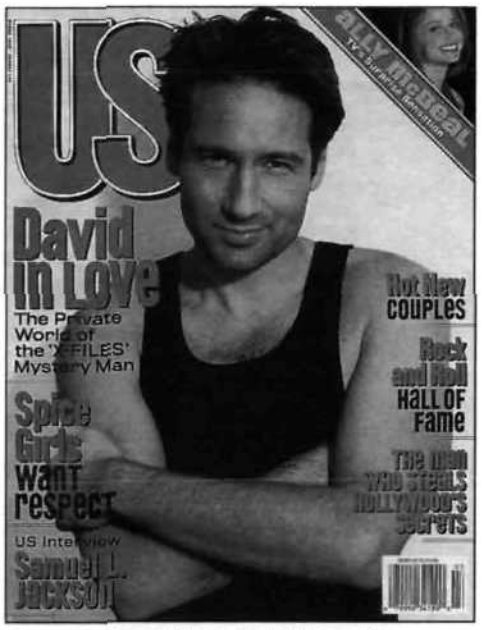
What do actors David Duchovny, Ben Affleck, and Matthew McConaughey have in common? Fame. Fortune. A penchant for science fiction films about the apocalypse. And oh yes—each has been cursed.

Consider the evidence. A recent issue of *Newsweek* noted that each actor has been featured in a different periodical in what could be mistaken for identical photographs. The shots of *X-Files* star David Duchovny (appearing in *Us* magazine) and *Armageddon*'s Ben Affleck (in *GQ*) bear an uncanny resemblance to a photo of *Contact* star Matthew McConaughey that appeared some time ago in *Vanity Fair,* when he was widely touted as the "hot" new actor on the

Hollywood scene.

And indeed, there is a resemblance: All three actors can be seen in nearly identical poses, sprawled across the front seats of old pickup trucks in jeans, rumpled shirts, and meticulously tousled hair. But it was not this eerie similarity that caught our eye. Instead, it was a warning offered by *Newsweek* to Duchovny and Affleck: "In his post-pickup phase," the article notes, McConaughey "has sometimes had a difficult time pleasing the critics" (Sigesmund 1998, 91).

The implication of the warning, presumably, is that Duchovny and Affleck should take heed of the fact that McConaughey's rise to fame became somewhat less meteoric following the publication of his pickup-truck photo. Furthermore, the insinuation is that the photograph may have had something to do with it—and that the same thing could happen to the other two.



Famous actors, athletes, and other performers are likely to experience a slump in their careers following magazine appearances like this one in *Us*.

To be sure, *Newsweek* offered its warning in jest. With a few notable exceptions, one's fame is unlikely to be affected by activities in the front seat of an automobile. But it is the case that film critics lost some of their taste for McConaughey shortly after his photo appeared in print—no longer is he Hollywood's "golden boy." And what is more, we confidently predict that a similar fate is likely to befall the other two actors. They too will likely find their celebrity fleeting. Importantly, however, we base our prediction not on any "pickup-truck curse," but on a mathematical truism known as the *regression effect*.

The Regression Effect

In the late nineteenth century, Sir Francis Galton conducted a rather uninteresting study that just happened to produce a result "of timeless significance" (Edwards 1993, 96). Galton was interested in the relationship between the heights of fathers and their sons. The uninteresting part is that he found one: Tall fathers have taller sons than do short fathers. (Of course, the same holds true for fathers and daughters, as well as for mothers and their children.) Galton's correlation was less than perfect, but it was there, just as expected.

But Galton also noticed something quite unexpected (Edwards 1993). Despite the strong relationship between the heights of fathers and sons, the tallest fathers tended to have sons that were somewhat shorter than the fathers themselves (Galton 1885). Likewise, the shortest fathers had sons who, although short, were a bit taller than they were. Why this curious attenuation? As it turns out, it *has* to be true.

To see why, it is necessary to recall that height, like many things, is multi-determined. One reason people are tall is because they have inherited the genetic predisposition to be tall, hence Galton's initial finding. But height is not purely a genetic affair, and even its genetic component is not controlled by a single gene. A person's height, after all, is determined by such disparate physical features as the height of the forehead, the length of the shinbone, and the size of each vertebra. For a person to be unusually tall or short, then, a great number of things must fall into place. A very tall person must acquire the gene from the right parent for each of these physical features, as well as receive a healthy diet, plenty of exercise, and freedom from growth-stunting pathogens. Scientists refer to the contribution of all of these hard-to-prophesize elements as "random error."

What Galton recognized was that extremely tall people tend to have random error working in their favor. That is, they are tall not simply because their parents were tall, but also because they got just the right combination of genes from their parents, were well nourished as children, led healthy lives, and so on. Of course, the children of these very tall people will, in turn, benefit from a tall gene pool, but random error is unlikely to work so well in their favor. The genetic "lottery" is unlikely to award them the favorable parental gene for as many physical features, and their childhood experiences are unlikely to be as kind. The net result is that, on average, they will be shorter than their parents. (The logic is reversed for extremely short parents.)

This is the regression effect: When two variables are imperfectly related, extreme values—high or low—on one of the variables tend to be matched by less extreme values on the other. As a consequence, very tall fathers tend to have tall children, but not as tall (on average) as they are themselves; high school valedictorians tend to do well in college, but not as well

A slip in Duchovny's or Affleck's popularity is likely, not because of any pick-up truck curse, but because of the regression effect.

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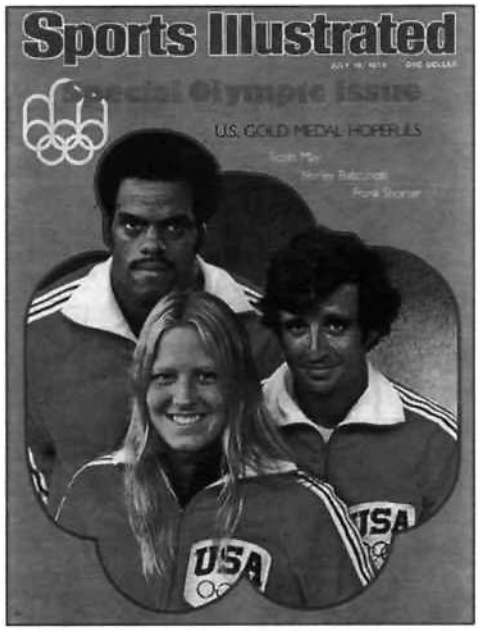
(on average) as they did in high school; a company's disastrous years tend to be followed by more profitable ones, and its banner years by those that are less profitable.

What does all this have to do with Duchovny, Affleck, and McConaughey? Think of the week-to-week fluctuations in an actor's fame—exemplified by gossip columnists' relentless listings of "who's hot and who's not"—as analogous to the fluctuations in height over successive generations. To focus on those celebrities who happened to have their pictures featured in national magazines (whatever the pose) is like considering only the tallest of parents: In both cases, one has sampled from the upper tail of the distribution. The three actors in question each had their pictures featured (as is typically the case) when they were particularly newsworthy—i.e., when their careers were at a peak. And since an actor's popularity at different moments in time is imperfectly correlated (there is more than a little random error there, to be sure), one can predict by regression alone that an extraordinarily "hot" moment will be followed, on average, by a somewhat less extraordinarily hot moment, just as an extraordinarily tall parent tends to be followed, on average, by a somewhat less extraordinarily tall son or daughter.



The *"Sports Illustrated* jinx" is likely the result of regression effects. Although athletes are thought to perform poorly after appearance on the cover, Shirley Babashoff (center) went on to win five medals at the 1976 Olympics.

Thus, the *Newsweek* warning may be right—but for the wrong reason. A slip in Duchovny's or Affleck's popularity is likely, not because of any pick-up truck curse, but because of the regression effect.

Although the regression effect is easy to grasp, people often have difficulty spotting its influence in everyday life. This can result in a variety of superstitious beliefs, from the benign to the pernicious. We review a sample of these in the remainder of this article. Consider, first, three examples from the world of sports.

Regression Effects in the Sports World

Professional athletes are not known to shy away from celebrity. And yet, when it comes to having their picture featured on the cover of *Sports Illustrated* magazine, a surprising number would happily go without. Why the sudden modesty? Many athletes and fans alike believe that it is bad luck to be featured on the cover of that particular publication. Despite the prestige, they fear that it will spell doom for whatever athletic success was responsible for getting them or their team on the cover in the first place. Swimmer Shirley Babashoff, for example, reportedly balked at having her picture taken for *Sports Illustrated* before the 1976 Olympics because she was afraid she would be jinxed (Gilovich 1991). (She was eventually persuaded to pose when reminded that a cover story on Mark Spitz had not prevented him from winning seven gold medals in the previous Olympic games. Babashoff herself went on to take home five medals.)

It does not take much statistical sophistication to see how regression effects may be responsible for the so-called *"Sports Illustrated* jinx." As is the case with an actor's popularity, an athlete's performances from time to time are imperfectly correlated, resulting from a mixture of true talent, situational factors, and random error. Thus, due to regression alone, one can expect an outstanding performance to be followed, on average, by a somewhat less outstanding performance. And since athletes, like actors, tend to appear on the covers of magazines when they are at a peak, an athlete's superior performance in the weeks preceding a cover story is likely to be followed by somewhat poorer performance in the weeks after. The supernatural is invoked to explain what simple mathematics handles quite nicely.

Consider another example, this time from the world of baseball. A player is called up from the minor leagues and has a brilliant rookie year in the majors, only to slip in his second season. This scenario is so familiar that it even has a name: the "sophomore slump" (Nisbett and Ross 1980).

Is the sophomore slump real? If one examines statistics such as batting-averages, fielding errors, and runs-batted-in, it becomes clear that it is not: There is no overall tendency for a major leaguer's performance to be lower in his second season than in his first. On the other hand, there is a tendency for *certain* players to experience a mysterious "slump" in their sophomore season. Any guesses as to which? It is those who had the most exceptional rookie seasons—those whose success was probably augmented by some amount of random error, and whose performance can be expected to decline, due to regression alone, in their second year.[1]

If there is no such thing as an overall sophomore slump, why does the myth persevere? Psychologist Saul Kassin suggests it is because baseball fans are not unlike the editors of *Sports Illustrated.* Just as the magazine preferentially selects the most exceptional athletes to feature on its cover, fans tend to think about and remember those players who have had the most exceptional rookie years. One remembers the dazzling debuts of Vida Blue, Mark Fidrych, and Fernando Valenzuela, for example, but not the hum-drum inaugural seasons of other, less celebrated rookies. Thus, belief in the sophomore slump results from a tendency of fans to spontaneously select instances from the upper tail of the distribution, and then to fail to realize that the exceptional performances of these players are likely to regress in their second seasons.

A final example from the world of sports involves a sure-fire

cure for a team's poor win-loss record: Fire the coach in mid-season and start afresh. (Indeed, for some teams, the firing and hiring of coaches is a sport unto itself!) And it works. Kassin found that baseball teams that fire their managers in mid-season win a greater proportion of their games after the change in leadership than before. But is it necessarily the case that a new manager *causes* the improvement? To be sure, there are undoubtedly cases in which the dismissal of an incompetent manager does have a causal effect on the team's level of play. But the same improvement can just as easily be accounted for by regression.

Once again, consider the circumstances that are likely to surround a team's decision to switch managers. Seldom, of course, would a team consider such dire action when things are going well, nor even when things are going only somewhat poorly. Firing the manager is a tactic that is reserved for exceptionally poor performance. And since a team's performance from game to game and year to year is correlated (most of the players are the same, after all)—but imperfectly so—a less abysmal record is almost sure to follow.

In science, the mantra "correlation does not imply causation" protects against mistakenly inferring cause from co-occurrence.

Superstition and Gambling

In 1992 alone, Americans wagered over 19.4 billion dollars in Nevada and Atlantic City casinos. They got only $16.3 billion of it back (Christiansen 1993). This is, of course, by design: All casino games are games of chance with the odds virtually always in favor of the "house"—and against the gambler. As a result, there are very few "winners" in casino gambling (unless, of course, you count the casinos). To make matters worse, these losses come at an especially great cost to a large proportion of gamblers who are at or below the poverty line (Borg, Mason, and Shapiro 1990).

The interesting thing about gambling is that gamblers *know* the odds are stacked against them. Well, sort of. Psychologists have long noted that people's expectancies for personal success in chance situations are often higher than the objective probabilities warrant (e.g., Langer 1975; Golin, Terrell, and Johnson 1977). For instance, gamblers are more confident in their chances of winning when they themselves roll the dice than when a croupier rolls for them, and they are more confident when given the opportunity to "practice." Craps players may realize that the objective likelihood of rolling a "natural eight" is 1 in 36, but may nevertheless "feel" as if it is higher.

One reason for this is that gamblers, even very experienced ones, subscribe to a number of superstitions about things they can do to improve their odds (Carroll 1998; Henslin 1967). Blow on the dice before you throw them to improve your luck. Concentrate on the number you want to get in order to achieve your desired roll. Throw the dice with the left hand to turn an unlucky streak around, or, odder still, get up and walk around your chair three times.

It should come as no surprise that such techniques are wholly ineffective. But it is easy to see how a perfectly rational person might come to believe otherwise. A strategy that a player adopts after a run of "poor luck" (such as throwing the dice with the left hand or blowing on the dice) will appear to be effective, not because it is, but because one's luck is unlikely to remain poor forever. Eventually, a string a poor outcomes will regress in the positive direction. Of course, the probability of a win is not directly affected by previous wins and losses, but if one's initial performance is poor enough, improvement is almost assured. After four lost bets on the roulette wheel, for example, the odds of improvement in the next four spins is 95 percent. Thus, a gambler will see his or her performance "improve" regardless of the strategy he or she adopted—whether it was concentrating on a particular number, blowing on the dice, or spitting on the dealer.

Note that this example is different from the others we have presented. In each case thus far, the various outcomes have been correlated: A father's height is related to his son's, a baseball player's performance in his rookie season is usually a good indicator of his performance in his second year, and a celebrity's fame at one time is correlated with his or her fame at another. In gambling, however, each roll of the dice or flip of the coin is an independent event, unaffected by the previous outcome. As a result, one can expect the amount of regression, and the misunderstandings that go along with it, to be even greater.[2]

Everyday Beliefs

Lest one think such erroneous beliefs are unique to desperate gamblers or thoughtless sports fans, consider a more common superstition, one that rings true even for, well, us. Many people subscribe to the belief that calling attention to one's successes (even privately) is a sure way to invite disaster. Indeed, certain rituals have evolved to quell the anxiety that people feel in such situations (Ferm 1959). The pronouncement that the family vacation has thus far gone off without a hitch, the baby hasn't cried all day, or the stock market is on a roll, is likely to send many individuals scrambling for a piece of wood to knock.

How does regression contribute to this belief? By definition, such activity is likely to occur only when things are going well—the very time at which one's circumstances can be expected to regress and take a turn for the worse. Reflecting on one's good fortune does not cause the decline, of course, it merely co-occurs with it. In science, the mantra "correlation does not imply causation" protects against mistakenly inferring cause from co-occurrence. Everyday causal inference, however, even among those trained in statistics, is often far less sophisticated (Kelly 1967; Quattrone and Tversky 1984).

Or consider the popular wisdom among fans of the cinema that a sequel is rarely, if ever, as good as the original. We have

little doubt that this observation is true. Whether one's measure is artistic merit or box office revenue, sequels are seldom the equals of their predecessors. To be sure, there are exceptions. Many film critics consider *Godfather II* to be as good as the original (e.g., Pauline Kael 1982), and several James Bond films have grossed more (even after correcting for inflation) than the original *Doctor No.* But examples of "sequel regression" are far easier to come by. *Star Wars* grossed far more than its sequels, as did *The Addams Family, Batman, City Slickers, Fletch, Free Willy, Home Alone, Jaws, Jurassic Park, Saturday Night Fever, Speed,* and dozens of others. Furthermore, virtually all of these films received more critical acclaim than their respective sequels.

What accounts for this trend? Avid moviegoers are quick to provide numerous explanations. Film studios may devote fewer resources to the script of a sequel, relying on patrons to buy tickets because of the quality of the original. Furthermore, some of a film's quality can derive from its novelty and originality. To the extent that a sequel capitalizes on the same basic formula as the original, then, viewers are likely to feel as if *they've "been there, done that."* These and other factors doubtless play a role in the typical slide in quality from original to sequel. But notice that regression alone would produce such a trend even if sequels were given the most lavish budgets and studios were not so complacent the second time around. After all, there is bound to be some random error in which movies garner critical acclaim and box office success. And since it is typically the most successful movies—ones that have likely capitalized on this random error—that are made into sequels, some regression is inevitable.

Alternative Medicine

Perhaps the most tragic instances of misunderstood regression come from a domain all too familiar to the readers of SKEPTICAL INQUIRER: the fringes of alternative medicine. Time *and time again, intelligent, rational people undergo medical* treatments of unproven efficacy. Ginseng, for example, has been advertised nationally as able to improve physical performance and mental alertness, despite data to the contrary (Bahrke and Morgan 1994). Shark cartilage is consumed with alarming frequency, based on the questionable logic that, since sharks do not get cancer, consumption of their cartilage ought to provide the same resistance (Lane and Comac 1992; 1996). As it happens, sharks *do* get cancer, as Lane and Comac reluctantly admit (1996, 25), but that has not quelled a seven-fold increase in the commercial slaughter of sharks in some areas as a result of the fad (NCAHF 1993). Herbalist Hulda Regehr Clark suggests a somewhat more benign treatment (for sharks, at least): She recommends a concoction of black walnut hulls, wormwood capsules, and ground cloves as a cure for both cancer *and* AIDS, according to her self-published book *The Cure For All Cancers.*

At best, these treatments are ineffective. At worst, they are dangerous. The herbal cure-all "ma huang," for example, has caused numerous deaths, as has the recent trend of coffee enemas, said to treat cancer and other diseases by "detoxifying" the body (Kolata 1996). The National Heart, Lung and Blood Institute has documented several cases of kidney failure and death in people who have undergone "chelation therapy," the intravenous injection of the synthetic chelating agent EDTA, advertised as a treatment for such diverse ailments as heart disease, Parkinson's, Alzheimer's, and sexual impotence. And in addition to these direct harms, such "cures" wreck havoc indirectly, since individuals may abandon more proven curative techniques in favor of alternative approaches.[3]

Given this track record, why are so many people convinced that these regimens work? One answer has less to do with *which* therapy an individual pursues than *when* he or she pursues it. As Beyerstein (1997) notes, many diseases are inherently cyclical—they have their "ups and downs." It is no great leap to assume that patients who seek alternative therapies do not do so arbitrarily, but when they have "hit rock bottom." Understandably so: Desperate times call for desperate measures. But the timing of such desperate action is likely to contribute to erroneous beliefs about the effectiveness of the remedies they try. Not *unlike the baseball team that fires its manager in the midst of a* slump and subsequently experiences an upswing in its performance, moments when one's medical condition flares up (and one happens to appeal to an alternative therapy) are likely to be followed by moments of relative relief. Thus, just as a change in a team's management can appear to have done the trick, a bogus therapy can seem effective, even when it is not.[4]

Note that the regression effect can apply just as readily to beliefs about conventional medicine. Take, for example, the common notion that a diet low in saturated fat can reduce one's serum cholesterol level. It can—but not as much as is commonly believed (Moore 1989). This exaggerated faith in the benefits of a low-fat diet is understandable, however, in light of when people change their diet.[5] One can most easily be coaxed into lowering one's intake of cheeseburgers and french fries after a test reveals an exceptionally high cholesterol *level. But such an exceptional result is likely to be due, at least* in part, to random error. Thus, when one is tested again, after weeks or months on a restricted diet, one is likely to get a lower result. To be sure, the change may be bolstered by changes in one's diet, but random error is unlikely to augment one's result as much as before. Thus, regression makes the causal relationship between treatment and cure appear stronger than it is.

Concluding Remarks

"It's getting better all the time. (It couldn't get no worse.)"
—John Lennon and Paul McCartney

We have discussed a number of superstitious and misguided beliefs that arise from a misunderstanding of statistical *regression. Notice, however, that individuals are not wholly* wrong in their predictions. In many cases, the predictions people make are quite accurate: Athletes or celebrities may well experience a lull in their careers immediately after being pic-

tured on a magazine cover, exceptional ballplayers often do go south in their second seasons, teams that fire their managers do subsequently perform better, and one may in fact experience an abatement of one's symptoms after trying an alternative medical therapy.

Thus, the error that individuals make is not one of *prediction,* but *explanation.* Elaborate causal scenarios that appeal to all manner of mystical, pseudoscientific, or otherwise superfluous beliefs are constructed to explain what is a simple mathematical given. One may be well advised to remember that when things get better, it is often, as Lennon and McCartney note, because they couldn't get much worse.

Acknowledgments

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Notes

1. Note that regression is likely to be something of a unidirectional phenomenon in this case. Although one might expect a "sophomore surge," on average, for those players who had exceptionally poor rookie seasons, such players are seldom asked back to the majors for a second year—or even make it all the way through their first. Indeed, this same asymmetry likely exists in a host of other domains, for analogous reasons. For example, professional musicians whose debut release is a flop are unlikely to land a second record deal, and businesses that turn in catastrophic losses in a particular year may be forced to close.

2. The amount of regression to be expected is inversely proportional to the magnitude of the correlation between the two variables. High correlation, less regression; low correlation, more correlation. In the extreme case of perfect association between two variables, there is *no* regression.

3. Worse still, those who utilize alternative therapies may come to ignore symptoms that indicate a need for medical attention. Indeed, patients may even be *instructed* to ignore such symptoms. The National Council Against Health Fraud (1996) notes that complaints of symptoms such as nausea, diarrhea, weakness, numbness, and tingling following herbal "detoxification" treatments are often ignored because salespeople falsely tell consumers that such symptoms are normal, and are due to the "cleansing" of the body.

4. It is for precisely this reason that clinical trials necessitate a placebo control group. Without one, it can be difficult to separate the effectiveness of the therapy from the natural course of the disease. Alternative medicines, because they are often classified as "dietary supplements," are not required to be tested in this manner by the Food and Drug Administration.

5. Another reason derives from what psychologists call the "representativeness heuristic," the notion that "like goes with like" (Kahneman and Tversky 1972; Gilovich and Savitsky 1996). Because the fat on the side of a steak or on the bottom of a skillet looks like it could clog arteries, one assumes that it does.

References

Bahrke, M. S., and Morgan, W. P. 1994. Evaluating the ergogenic properties of ginseng. *Sports Medicine* 18, 229–248.

Beyerstein, B. L. 1997. Why bogus therapies seem to work. SKEPTICAL INQUIRER 21, September/October 29–34.

Borg, M. O., P. M. Mason, and S. L. Shapiro. 1990. An economic comparison of gambling behavior in Atlantic City and Las Vegas. *Public Finance Quarterly* 18, 291–312.

Carroll, W. 1998. *Superstitions: 10,000 You Really Need.* San Diego, Calif.: SD Books.

Christiansen, E. M. 1993. 1992 gross annual wager: Industry rebounds with 8.4% handle gain. *Gaming and Wagering Business* 14, 12–35.

Edwards, A. W. F. 1993. Galton, Karl Pearson and modern statistical theory. In M. Keynes Ed., *Sir Francis Galton, FRS: The Legacy of His Ideas* (pp. 91–107). Houndmills, Basingstoke, Hampshire: Macmillan

Ferm, V. T. A. 1959. *A Brief Dictionary of American Superstitions.* New York: The Philosophical Library, Inc.

Galton, F. 1885. Regression towards mediocrity in hereditary stature. *Journal of the Anthropological Institute of Great Britain and Ireland* 15, 246–263.

Gilovich, T. 1991. *How We Know What Isn't So: The Fallibility of Human Reason in Everyday Life.* New York: Free Press.

Gilovich, T., and Savitsky, K. 1996. Like goes with like: The role of representativeness in erroneous and pseudoscientific beliefs. SKEPTICAL INQUIRER 20, March/April, 34–40.

Golin, S., T. Terrell, and B. Johnson. 1977. The illusion of control among depressed patients. *Journal of Abnormal Psychology* 88, 454–457.

Henslin, J. M. 1967. Craps and magic. *American Journal of Sociology* 73, 316–330.

Kael, P. 1982. *5001 Nights at the Movies: A Guide From A to Z.* New York: Holt, Rinehart and Winston.

Kahneman, D., and A. Tversky. 1972. Subjective probability: A judgment of representativeness. *Cognitive Psychology* 3, 430–454.

Kahneman, D., and A. Tversky. 1973. On the psychology of prediction. *Psychological Review* 80, 237–251.

Kelly, H. H. 1967. Attribution theory in social psychology. In D. Levine Ed., *Nebraska Symposium on Motivation* (Vol. 15, pp. 192–240). Lincoln, Neb.: University of Nebraska Press.

Kolata, G. 1996. On Fringes of Health Care, Untested Therapies Thrive. *The New York Times* June 17. p. A1, C11.

Lane, I. W., and L. Comac. 1992. *Sharks Don't Get Cancer.* New York: Avery.

Lane, I. W., and L. Comac. 1996. *Sharks Still Don't Get Cancer.* New York: Avery.

Langer, E. J. 1975. The illusion of control. *Journal of Personality and Social Psychology* 32, 311–328.

Moore, T. J. 1989. *Heart Failure: A Critical Inquiry into American Medicine and the Revolution in Heart Care.* New York: Random House, c1989.

National Council Against Health Fraud. 1993. *NCAHF Newsletter* Vol. 16, July/August. Loma Linda, Calif.: Author.

National Council Against Health Fraud. 1996. *NCAHF Newsletter* Vol. 19, March/April. Loma Linda, Calif.: Author.

Nisbett, R., and L. Ross. 1980. *Human Inference: Strategies and Shortcomings of Social Judgment.* Englewood Cliffs, New Jersey: Prentice-Hall.

Quattrone, G. A., and A. Tversky, 1984. Causal versus diagnostic contingencies: On self-deception and on the voter's illusion. *Journal of Personality and Social Psychology* 46, 237–248.

Sigesmund, B. J. 1998. Pinups pop up in pickups. *Newsweek* March 2. Hollywood scene. □

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The Psychology of the Séance, From Experiment to Drama

In which the authors first conduct an experiment showing how suggestions and prior belief strongly determine what observers report seeing during a séance—then use the findings to perform five nights of public theater in a former Victorian prison as an entertaining way of communicating about skepticism and critical thinking.

RICHARD WISEMAN, CLIVE JEFFREYS, MATTHEW SMITH, and ANDY NYMAN

A few years ago we wrote an article for SKEPTICAL INQUIRER describing an unusual experiment examining eyewitness testimony and the psychology of séance room phenomena (Wiseman et al. 1995). We staged three séances, each attended by twenty-five people, and the experiment was designed to assess the reliability of the participants' testimony. All of the phenomena that occurred were faked.

During each séance, the participants were seated around a small table in a darkened room. A book, a hand bell, a slate and a maraca, all of which had been treated with luminous paint, were situated on the table, and everyone was asked to concentrate on these objects and try to make them move.

One object—the maraca—was gimmicked to roll across the table and fall to the floor. All other objects remained stationary.

All participants completed two questionnaires. The first, given before the séance, asked whether they believed in the paranormal. The second, after the séance, was concerned with their experiences during the event.

We discovered that 27 percent of people incorrectly reported that at least one of the stationary objects had moved. Also, significantly more believers than disbelievers reported the illusory movement of stationary objects, and tended to interpret the séance phenomena as genuine paranormal events.

Last year, we decided to continue research on this topic by investigating suggestibility in the séance room. Some researchers believe that conditions commonly associated with a séance (darkness, uncertainty, fear, etc.) may make people susceptible to suggestion, and that by suggesting that phenomena are occurring, mediums can create a reality in the minds of sitters. We set out to put this idea to the test.

Our new experiment took place in March 1997 at a convention held by the *Fortean Times*—a U.K.-based magazine covering a wide variety of "strange phenomena." This time we staged eight séances, and, as before, twenty-five people attended each, with all participants completing a similar pre-séance questionnaire. The setting and séance objects remained unchanged, apart from the inclusion of a wicker ball, which was gimmicked to move instead of the maraca.

The fourth author, Andy Nyman, is a professional actor and magician. Andy kindly agreed to play the part of the medium, and he followed a set script for all of the séances. Initially, the participants were asked to join hands. All of the lights were then extinguished and the objects on the table became visible from their luminous glow. The group was first asked to concentrate on the ball. It slowly rose approximately twelve inches into the air, moved around the séance room, and gently returned to the table. Andy then asked everyone to concentrate on moving the table. The table remained completely stationary, but Andy suggested that it was in fact levitating with comments like "That's good, lift the table up, that's good, keep concentrating, keep the table in the air."

Two weeks later, all the participants were sent a questionnaire about their experiences during the séance. We first asked people whether they thought that any of the phenomena they had experienced were actually paranormal. As with our first experiment, participants' belief in the paranormal affected how they interpreted what they had seen, with 40 percent of believers stating that the séance was genuine, compared with only 2.6 percent of disbelievers.

A second question examined whether the verbal suggestion had been effective. The results were startling. A massive 34 percent of people stated that they had actually seen the table levitate. Again, participants' belief in the paranormal played a key role, with 51 percent of disbelievers correctly stating that the table didn't move, versus just 31 percent of believers.

Our questionnaire also asked people whether they had had any unusual experiences during the séance. Almost one in five people said that they had, and reported various strange feelings, including cold shivers when concentrating on the objects, a strong sense of energy flowing through the circle and a presence in center of the room near the table. Thirty percent of believers reported these experiences compared to just 8 percent of disbelievers.

Co-authors Andy Nyman (left) and Richard Wiseman: Out of the lab and into the theater.

In short, we discovered that believers were significantly more likely than disbelievers to interpret the fake and illusory phenomena that happened during the séance as genuine paranormal events. In addition, more than a third of people were convinced that the table had moved as result of a few authoritative comments from our "medium," and the degree to which they were affected by these suggestions was related to their belief in the paranormal. Finally, believers were more likely than disbelievers to report unusual experiences during the séance.

At the end of the experiment we sent a short report of our findings to everyone who participated in the study and received some intriguing feedback.

Some people couldn't believe that the table hadn't actually levitated and wondered whether we really had brought about a genuine paranormal levitation without realizing it. Luckily, we had recorded all of the séances via an infrared camera, and a quick look at the resulting footage revealed that the table had indeed remained earthbound throughout all of the séances!

Other people said that they had found the whole exercise fascinating and had become far more skeptical about the evidence for both séances and the paranormal. This type of feedback made us wonder whether it might be possible to use the concept of the fake séance to help promote skepticism and

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critical thinking. After much discussion we decided to develop the séance into a show for the general public. The scene was set for "Séance—An Evening of Spirit Theater."

The show was devised, written, and performed by Richard Wiseman and Andy Nyman. March 1998 was chosen for the show, in order to coincide with British National Science Week. The week is full of events designed to help the public to understand science, and we thought that the séance show would be an unusual but appropriate addition to the calendar.

A venue was required that ideally would be damp, dark, and uninviting. The House of Detention—a disused, underground Victorian prison in the heart of London, and a popular tourist attraction, met the criteria perfectly. With the venue established, we contacted various media, including BBC television and radio, and managed to generate considerable interest in the venture.

We staged two performances each evening for five nights, and had a maximum of twenty-five people attend each performance.

In the first half of the show the audience was led through the maze of prison corridors and told about the history and psychology of modern séance. The first stop was a dark cell, where the story of the Fox sisters was told. The audience heard how the sisters had started the craze for spirit communication in the 1840s, and how the social conditions of the time helped to spread the notion across America and throughout the world.

The tour continued into a second cell where the audience was told how many of the professional mediums working during the Victorian era were tricksters. This concept was illustrated with an outline of the life and times of Henry Slade, whose career as a medium was cut short by being repeatedly exposed as a charlatan and who eventually died penniless in an American workhouse. The audience was shown the secrets behind some of the tricks used by Slade to fake spirit slate writing and manifestations.

The next section of the show took place in another dimly lit, claustrophobic Victorian prison cell and illustrated how a séance can be the perfect setting for suggestion and mild hallucination. This section centered around the story of D. D. Hume, a medium who was responsible for some of the most impressive séance phenomena, including a famous 'levitation' at Ashley Place, London.

Finally, the audience was shown a short slide show of rare and historic photographs, illustrating how even the most eminent witnesses of séance phenomena may be less than reliable. Sir William Crookes's investigation into the medium Florence Cook was given as an example. Crookes, an eminent Victorian scientist with a distinguished reputation, vouched for Miss Cook's materializations and spirit contact. Only later did accusations of illicit meetings and an extramarital affair between Crookes and Cook raise questions about the research.

At this point the audience had heard how séance conditions were perfect for trickery, suggestion, and self-deception. However, to make these points in a more vivid and experiential way, everyone was invited to travel back in time and take part in a theatrical reconstruction of a Victorian séance.

The audience was quickly led along a narrow ventilation shaft into the heart of the prison. Here, lit only by candlelight, Andy Nyman sat at the head of a large table. The audience tentatively took their seats and the séance began.

The first section was designed to create a tense atmosphere and involved telling a Victorian ghost story—The Murder of Marie Ambrose. During the story the audience had to look through a packet of Victorian photographs and select their favorite image, set an old pocket watch to the time of their choice, and randomly choose a four-digit number. At the end of the story Andy revealed a report of the murder from a turn-of-the-century newspaper. The photograph chosen by the group proved to be identical to the picture of Marie shown in the paper; the watch had been set to the time of Marie's murder; and the four-digit number corresponded to the year that she died. The séance was set to begin.

Luminous objects, including the maraca, the hand bell, and the wicker ball, were examined by the group and placed on the table. Everyone joined hands and the candles were extinguished. In pitch darkness Andy slowly summoned the spirit of Marie Ambrose. After a few minutes, the objects moved and levitated from the table, to gasps and screams from the participants. These phenomena were achieved via a mixture of techniques actually used by fake mediums at the turn of the century and from the lessons learned from our experiments into séance psychology.

The show quickly sold out and gained a great deal of media coverage. Perhaps more important, it provided an unusual and compelling way of communicating skepticism. Research carried out at museums suggests that hands-on exhibits are far more effective than more traditional types of displays. Our show extended this concept to provide people with an extremely memorable experience that helped them appreciate that the evidence for some paranormal phenomena is far from reliable.

We have now carried out two large-scale experiments into the psychology of the séance and have used these studies as a basis for a unique initiative designed to communicate skepticism to the public. Our results strongly suggest that witnesses are often less than reliable and that their beliefs about the paranormal influence both their experiences during the séance and the way in which they interpret these experiences. In addition, we have found the concept of the fake séance an appealing and effective tool for illustrating the main findings of our research and communicating a skeptical perspective on paranormal phenomena in general.

Acknowledgments

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Reference

Wiseman, R., M. Smith, and J. Wiseman. 1995. *Eyewitness testimony and the paranormal.* SKEPTICAL INQUIRER November/December, 29–32 □

Dowsing and Archaeology
Is There Something Underneath?

An examination of the available published evidence for dowsers' ability to trace hidden archaeological features shows that field tests were badly designed and executed.

MARTIJN VAN LEUSEN

Next to buried treasure and water, archaeological remains have long been the object of dowsers' efforts. Professional and student archaeologists regularly encounter local dowsers during fieldwork, sometimes accepting their offers to provide help by dowsing the site under excavation. Archaeological dowsing techniques are essentially identical to the techniques used for water dowsing. The position of the dowsing rods, one held in each hand, is inherently unstable so the points easily deviate up to 90 degrees either side of the "straight forward" or resting position. The dowser moves over the area, interpreting and mapping the movement of the rods until archaeological features have been located (see Figure 1).

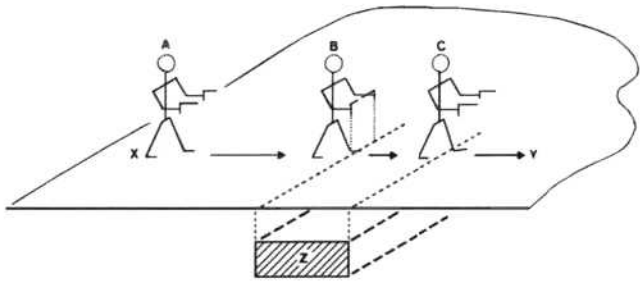

Figure 1: The technique of archaeological dowsing as portrayed in Bailey et al. (1988, Plate 14 and figure 32). Note that the movement of the dowsing rods at B and C precludes any uncertainty about the nature of the interfaces. The photo at right shows proper stance and hand position for dowsing.

In my own work, studying the buried Roman city of Viroconium and its hinterland in modern-day Shropshire (U.K.), I have been offered help by local dowsers whose activity at the site went back at least sixty years:

> A diviner who believed that gold treasure lay under the ruins of Viroconium, the Roman city near Shrewsbury, was permitted to excavate at a spot where the divining rod appeared to give the most pronounced indications of metal. A stone weighing half a ton had to be removed, and then digging to a depth of six feet gave a negative result. (*Antiquity* 8:350—*Birmingham Daily Mail,* 13 April 1934)

Moreover, in informal contacts with fellow archaeologists both in the U.K. and in the Netherlands, I found many who believe there is something worthwhile in dowsing, and few that have categorically denied its value; however, neither belief appears to be based on any serious study of the evidence.

Yet if dowsing were found to work, it would not just add a valuable new tool to the modern archaeologist's toolkit of noninvasive prospecting techniques; it would also constitute a major scientific discovery in biology and physics. So, if even we professional archaeologists think it might work, you would expect us to study it, right? Not so—hardly anyone ever mentions the subject during scientific get-togethers. Why should this be? Do we shy away from it for fear of losing our academic standing? Are a few lone and brave proponents being ignored by the scientific establishment?

I decided the best place to start my research would be the directly related field of archaeological prospection.

Noninvasive Archaeological Prospection

Many practitioners and proponents of dowsing advocate an openly paranormal view of the phenomenon, in which the practitioner has the extraordinary powers needed to detect buried archaeology (some even claiming to do this by dowsing from maps) or the archaeological features radiate some paranormal "force" (as in the "energy" and "ley lines" emanating from Stonehenge and other important sites; see Hancock 1998). Although dowsing has therefore been one enduring theme within psychic archaeology in general (Cole 1980, 14), such views do not win many converts among professional archaeologists. Rather, the alternative view that dowsing is based on some physical force that some (or all) people are sensitive to, especially when aided by dowsing rods, seems to be the one that is regularly encountered among students and professional archaeologists. The main candidate for this physical force is taken to be magnetism, which, in the form of Earth's magnetic field, several species of bacteria, birds, and perhaps some mammals have been shown to be sensitive to (Williamson 1987). Proponents of dowsing argue that humans are similarly sensitive to the weak magnetic fields generated by some buried archaeological features.

Contrary to popular belief, archaeologists do not always excavate—they will use the research method that does the least possible damage to buried archaeology given the research objectives. Many methods, such as geophysical surveys, do no damage at all and are far less costly than excavation as well. These are called *noninvasive prospecting* methods. Just about every part of the electromagnetic spectrum has been harnessed over the past few decades in order to prospect for archaeological remains. The workhorses of archaeological geophysics today are the *resistivity meter* and the *magnetometer,* both originally developed some forty years ago (and refined ever since).

The resistivity kit is an example of an active survey tool; it consists of a portable frame with two probes that are pushed into the ground at regular intervals. A current potential is set up for each measurement and the resistance of the ground to that current is measured and logged for later display and analysis on the computer. The kit detects electrical properties of the soil that are mostly caused by variations in water content and chemical and physical composition of the soil. For example, a buried stone wall will have almost no current-carrying ions available, and a current potential set up across it will therefore meet with a high resistance. A buried ditch with a humic soil filling will have lots of ions able to move and will therefore register a low resistance. By recording resistance values at regular intervals within a measured grid and translating them into on-

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screen grey scale values, a "map" of the main subsurface features can be built up fairly quickly.

Magnetometry is an example of a passive survey method, the hand-carried instrument continuously recording subtle gradients in the local earth magnetic field which are mapped in a manner similar to that described above. Such gradients are caused by many buried man-made materials (for example tile, pottery, and metals) and also by burning (hearths, kilns, house fires). Interestingly, these gradients are so weak that the surveyor must wear special nonmagnetic clothes and shoes in order to obtain useful results—thus, there is a huge difference between being able to detect the direction of Earth's magnetic field, which has a typical strength of about 50,000 nanotesla (nT), and being able to detect the *local deviations* in that field caused by near-surface buried archaeology. The latter are on the order of only a few nT in strength, about ten *thousand* times weaker than Earth's magnetic field itself. The suggestion that dowsers are sensitive to local variations in field strength is therefore unlikely *a priori*. For full details of these methods and their application in archaeology, see the excellent reference texts by A. Clark (1996) and Weymouth (1986).

More recently, the reflectance of sunlight from soil and crops in multiple wavelengths all the way from ultraviolet to infrared, and the "echo" produced by sending radar waves into the ground (ground penetrating radar or GPR) have also been put to the service of archaeological prospecting. Since the late 1970s archaeologists have employed multispectral imagery from the Landsat and SPOT satellites and, since the late 1980s, various airborne remote sensing platforms to extend the range of noninvasive data from which archaeologically relevant information could be gained (Archaeological Data Service forthcoming; El-Baz 1997). Today, all these methods of geophysical survey and remote sensing are widely employed by archaeologists because they are efficient, relatively cheap, fairly well understood, and do not destroy what remains of our distant past.

So what do professional archaeological geophysicists think of dowsing? An Internet trawl on the keyword "dowsing" brought up only one significant mention—the University of Southampton (U.K.) Department of Archaeology offers a short practical course introducing the use of geophysical techniques in archaeology. Students do "a blind dowsing test" comparing dowsing to results obtained with standard geophysical equipment. When I asked for more details, the course tutor explained that she feels dowsing is "not a science, nor unscientific" since nothing at all is known about it. To her it is "an interesting phenomenon which no one has the time or appropriate scientific background to investigate objectively and with a properly devised methodology." She added that dowsing is "not a gift, as anyone can get a result of some sort" (Kate Clark 1996, pers. comm.).

Others do not take such an open-minded stance. A recent technical review paper published by the British Institute of Field Archaeologists, until recently Europe's only professional body for archaeologists, discusses noninvasive surveying at length. The subsection on dowsing reads in full:

> "This technique has long been practiced by archaeologists. Unfortunately the scientific principles, if there are any, are not understood, and as such the technique should not be used for evaluation purposes." (Gaffney, Gater, and Ovenden 1991, 6)

The reader might be forgiven for thinking this an example of scientific closed-mindedness. After all, not knowing the physical basis for dowsing does not in itself invalidate the technique. Compare this to the final paragraph of the section on dowsing in a well-known treatise on archaeological prospecting:

> "Many controlled tests of dowsing have proved totally negative, and many results remain speculative and untested, or scientifically incredible, for instance the 'imprint' effect, by which the dowser appears to be able to detect structures no longer present. But the growth of knowledge has overturned scientific orthodoxy more than once, and it is seemly to keep an open mind." (A. Clark 1996, 123)

The author notes the then-recent publication of *Dowsing and Church Archaeology* (Bailey, Cambridge, and Briggs 1988) for its use of proper scientific experiment in studying dowsing. I will discuss this important publication in some detail further on.

Separating actual *proof* that dowsing works from the mechanism that *allows* it to work, we see a range of different reactions to the phenomenon. Gaffney et al., while admitting dowsing is used in practice, advise against its use because no mechanism has been established; they do not comment on the availability or quality of the evidence at all. A. Clark (1996) discusses one possible mechanism (human sensitivity to magnetic fields) and returns a verdict "not proven," then goes on to give favorable mention to experimental work that seems to indicate that dowsing does sometimes work. Finally, Dr. Kate Clark is aware that no scientific explanation is available for dowsing yet, but accepts subjective evidence that it works in practice.

These, then, are the opinions of some of the best professional archaeological geophysicists in Britain. Dowsing is seen as residing somewhere on the edges of science, a phenomenon established enough (if only by anecdotal evidence) to merit mild professional interest, but not respectable enough to be firmly associated with true "fringe archaeology" (Van Leusen 1996). Geophysicists' opinions seem to be less positive about dowsing than the *informal* opinions of nongeophysicist archaeologists. Why should this be so? Perhaps archaeological geophysicists attach more importance to knowing the *mechanism* behind dowsing, whereas other archaeologists are more interested in knowing whether it *works*—that is, whether claims of dowsed features coincide with actual archaeological features.

A review of attitudes toward dowsing both in the general and the archaeological literature shows that, as 1960s and 1970s New Age thinking made its mark in academia generally, a more favorable view of dowsing slowly made its way into influential introductory books on archaeology in the U.S., Britain, and parts of western Europe (e.g., Noël Hume 1969, 37–38; Greene 1983, 51; and Rahtz 1985, 127). A study by Feder (1984) shows that, by the early 1980s, dowsing was the fringe claim least likely to receive negative treatment in class by

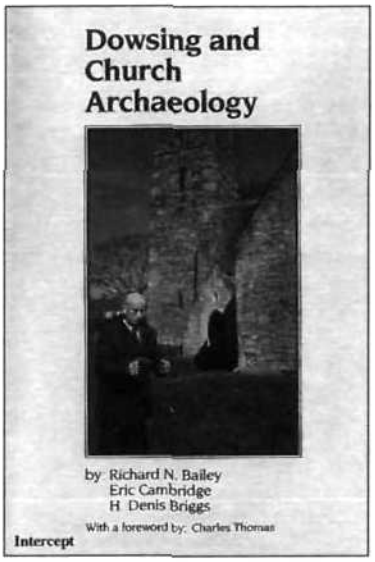


Figure 2: Cover of *Dowsing and Church Archaeology*, often cited as the strongest case yet made for the reality of dowsing in archaeology.

professional teaching archaeologists and was the most likely to receive positive (13.5%) or neutral (16%) coverage. By the early 1980s, therefore, treatment of dowsing by archaeological educators was relatively positive. More than one generation of today's archaeologists has been raised on such fare, explaining in part the favorable attitudes I have encountered among colleagues. Such beliefs must have received further reinforcement through selective reporting—the tendency to perceive tests with negative outcomes as failures and leave them unreported.[1]

One other reason why geophysicists might be more cautious about dowsing may be that, in general, they have a more science-oriented educational background and are therefore less prone to accept anecdotal evidence. In contrast, many "digging" archaeologists have little if any education in scientific methodology such as the use of controlled tests. To explore these possibilities, I reviewed published archaeological field tests of dowsing.

Field Tests of Dowsing

Just as water dowsers tend to locate underground streams and sources, ignoring the fact that such features only occur in specific geological situations (e.g., Karst landscapes) and that it is difficult *not* to find water in most places, so the archaeological dowser often has a predilection for buried treasure, walls, or graves. Such features have an appealing conceptual clarity that should make for easy field testing. Witness the report of the early unsuccessful dowsing attempt at Viroconium—a gold treasure is either there, or it isn't. In another early field test carried out by Aitken (1959) the question of whether the dowser was able to pick up typical magnetic field strengths associated with buried archaeological features was studied. Aitken compared the locations of dowsed features with those of strongly magnetic Roman pottery kilns known through excavation and geophysical prospection and found that the dowser had not been able to pick these up. These examples illustrate two important ingredients of successful scientific testing—simplicity and controls—which have been sadly lacking in more recent work. This is exemplified by the publication, in 1988, of a book about dowsing and church archaeology, written by two academics and a retired engineer (Bailey et al. 1988. See Figure 2).

Dowsing and Church Archaeology

With a foreword by yet another academic, the book was presented as a serious research effort. It convinced at least one reviewer of the essential validity of the technique (Rahtz 1988) and is often cited as providing the strongest evidence yet to substantiate dowsers' abilities in locating buried archaeological features (e.g., Clark 1996, 123; Locock 1995; and Wilcock 1996). The authors claim that dowsing was successful in tracing buried features in eight out of eleven tests. These successes were reportedly obtained without the benefit of documentary evidence and other extraneous clues, and several were claimed to be accurate to less than 3 centimeters at depths up to 1.4 meters. If true, such accuracy would compare favorably with that of all other archaeological prospecting techniques! Since it is the only published full-length scientific study on the subject, *Dowsing and Church Archaeology* clearly deserves a thorough examination.

The book is well written, and the early chapters describing the history and aims of church archaeology, the subterranean structures associated with churches, and the use of conventional geophysical devices are interesting in themselves if not particularly relevant to the actual dowsing tests. The second, and greater, part of the book presents the case for dowsing as a possibly useful technique by detailing a series of case studies where dowsed maps are compared with the results of excavations in and around churches.

Church archaeology, as a specialty within the general field of archaeology, is particularly fraught with practical difficulties. Churches tend to be the most stable elements in archaeological landscapes, both preserving and making inaccessible remains often dating back as far as the Anglo-Saxon period. Remains are often preserved because churches were rebuilt and expanded at the same location over and over again, with earlier phases partly preserved underneath later buildings. But they are also made inaccessible, because in addition to the difficulty of having a standing building of doubtful structural integrity on top of the archaeological remains, there are often restrictions of a religious nature if the building is still in use as a church or if (as is very often the case) people have been buried inside as well as around it. So, with more than one thousand years of building phases superimposed, plus the likelihood that only "keyhole" archaeology can be conducted, churches must count among the worst places in which to conduct dowsing tests.

The authors of *Dowsing and Church Archaeology* argue that a noninvasive method of tracing earlier building phases (which by their morphology would give the archaeologist clues for dating and function) would be a major step forward for church archaeology. They proceed to argue that dowsing merits a more thorough and open-minded evaluation than it had received up until then. Commendably, they set out a number of "arguments which, although superficially convincing, must be rejected as unassailable proofs of the dowser's capabilities" (Bailey et al. 1988, 33ff). Briefly, these are: 1) the presence of visual clues, 2) the availability of documentary information,

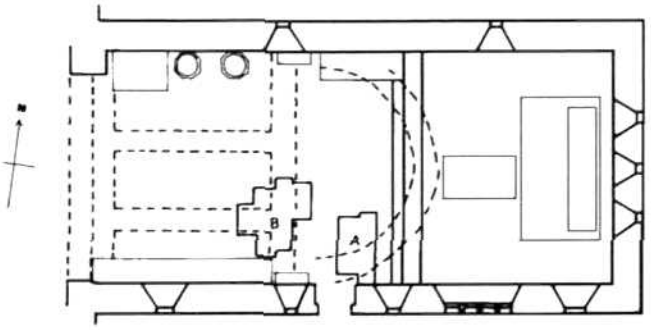
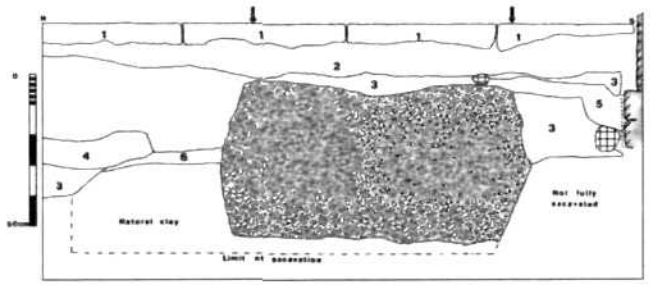
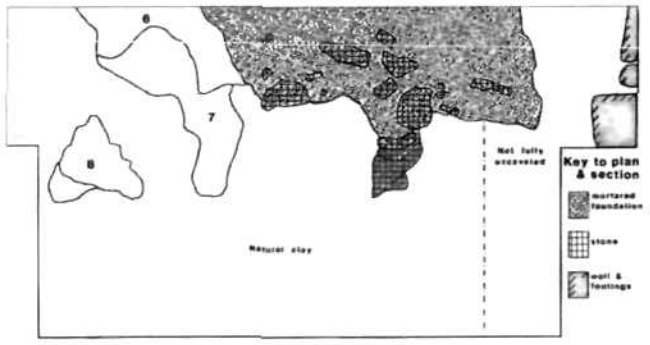


Figure 3a: Plan of St. Mary's Church, Woodhorn, with dowsed features indicated in dashed lines. Test trenches A and B were dug to confirm the presence of three wall foundations. Nothing was found in trench B. After Bailey et al. 1988, figure 6.



Section



Plan

Figure 3b: Enlarged plan and section of trench A, showing the mortared foundation that was found exactly where the dowser had indicated one. After Bailey et al. 1988, figure 7.

and 3) general plausibility. The authors emphasize that, although they find it unlikely that the dowsers in their experiments ever used such extraneous sources of knowledge, the need to exclude this possibility from their experiments is recognized.

In other words, although they are aware of the need for experimental controls, they have chosen the test environment very poorly, apparently putting their desire to find a solution for the *archaeological* problems posed by church buildings before their desire to test dowsing per se.

The core of the book consists of a presentation of nine excavations and one watching brief (one excavation is later split into two separate observations, yielding a total of eleven

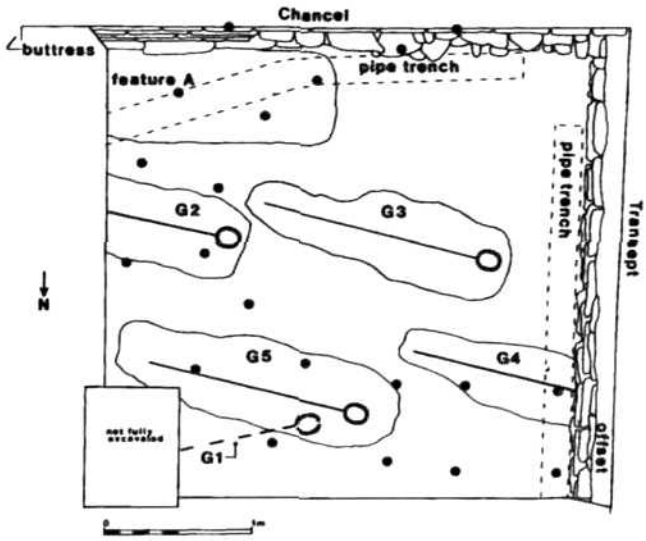


Figure 4: Plan of the excavation trench at St. Mary's Church, Ponteland, the aim of which was to test the presence of a curved wall foundation indicated by the two parallel rows of dots. G1 – G5 are graves. The pipe trenches, feature 'A' and the irregular stonework in the chancel wall all figure in Bailey et al.'s explanation of why no trace of the foundation was found. After Bailey et al. 1988, figure 20.

tests) that were conducted after dowsed plans had been obtained with the help of up to six dowsers, and for which, the authors contend, no prior visual or documentary evidence was available. Significantly, right from the start no further mention is made of their third experimental control, that of disallowing general plausibility.

Only two of the excavations, at Woodhorn and Ponteland, were specifically mounted in order to test dowsed plans; the others were opportunistic excavations wherever building works allowed the researchers to check on the dowsed plans. These two should therefore yield the most unambiguous evidence for the validity of dowsing. Yet, by the authors' own account, at St. Mary's Church, Woodhorn, they found a wall foundation where the dowsers had indicated one in the first of two excavation trenches, while the second trench uncovered no remains of *any* of the predicted junctions of linear features (45–49, see Figure 3). Again, at St. Mary's Church, Ponteland, *no* apse foundations were found where the dowser had indicated them ([70–74], see Figure 4). A charitable reckoning would therefore claim one hit and two misses here—yet the authors sum up the results as two hits and one "undecided"!

They reach this remarkable conclusion by citing, in the Woodhorn trench two case (69–70), documentary evidence that the dowsers picked up "imprints" of *temporary* wooden structures rather than extant wall foundations, and in the Ponteland case (74–81) excavated evidence that an apse had originally been there but had been *completely* destroyed in later construction phases. It is instructive to separate the authors' *archaeological* reasoning here from their discussion of the dowsing test itself. Their detailed reconstruction of a series of building phases at Ponteland, resulting in the complete removal of an early apse, is quite valid; however, their conclusion that experiments at both sites support the validity of

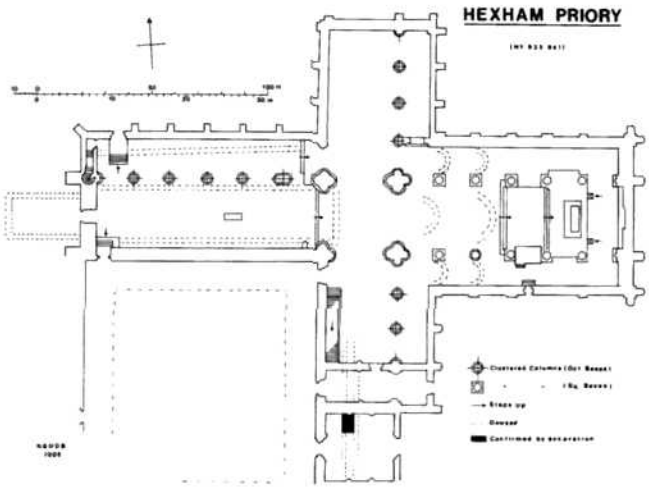


Figure 5a: Plan of Hexham Priory, with dowsed features indicated in dashed lines. A trench was dug in the southern vestibule area through what was obviously intended by the dowser as two parallel wall foundations. Bailey et al. claim the result was a clear hit: 3 out of 4 dowsed lines were found to coincide with archaeological 'interfaces'. After Bailey et al. 1988, plan 19.

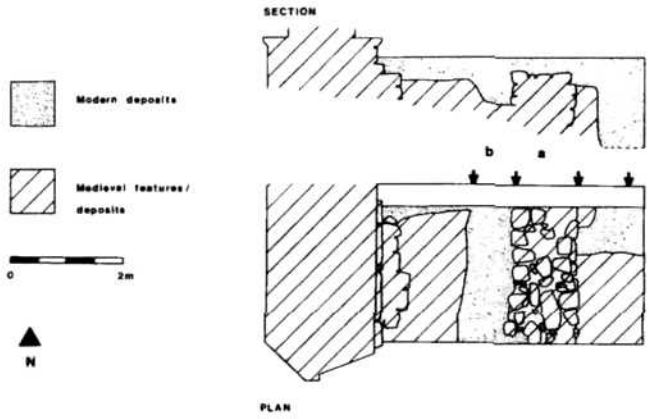


Figure 5b: The plan and section of the trench at Hexham Priory. Instead of the two parallel walls indicated by the dowser (see arrows), one wall foundation was found where it should not be (see also Figure 1); moreover, the existence of documentary proof for this wall should have led the excavators to discount it as evidence. The excavators further decided that the easternmost line must have indicated the presence of a modern trench cut, whereas no such 'interface' could be found for the westernmost line. After Bailey et al. 1988, figure 9.

dowsing relies completely on the hypothetical "imprint" effect, by which dowsers can apparently trace the former existence of structural and even temporary features for which *no physical evidence whatsoever remains.*[2] In the process they relinquish what limited experimental control they had established, for they employ documentary evidence to prove the former existence of temporary wooden features.

The authors follow a similar pattern at the other minor sites. At Hexham an excavation is carried out to test four dowsed lines, interpreted by the dowser as indicating two parallel foundations. Instead, one trench cut and one foundation are found, with no archaeological features coinciding with the fourth dowsed line (50–53, see Figure 5). The authors here again employ documentary evidence to prove that a foundation existed at this spot, breaking their own rules for admitting evidence.

In addition they choose to ignore the dowser's own interpretation when it suits them—strictly speaking, *none* of the four interfaces were found as predicted. At Kyloe no evidence to substantiate the dowsed lines was found in one of two trenches; the second trench yielded ambiguous evidence interpreted as strongly positive (the dowser is said to have "very accurately located the inner line of a feature at a depth of 1.21 meters below the surface." [58] See Figure 6). At Durham (58–60) virtually nonexistent evidence is blown up to provide "might be" evidence for dowsing. At Newcastle (60–63) the dowsed lines are linked to a very minor feature not related to foundations, which from the dowsed plan is clearly what the dowser "found." At Morpeth, finally, a foundation interface is found at one of the dowsed lines (64).

Reading through these cases, one finds an increasingly clear pattern. All the archaeological discussions were fine, which is how it got by some of its reviewers and many of its readers, but the dowsing "tests" were so vaguely defined and uncontrolled that it would hardly have been possible to *disprove* the existence of some archaeological feature at a dowsed line. But how exactly have Bailey et al. managed to do this?

To assess the outcome of each test, one needs to know the prior probability of finding an archaeological feature in any particular location associated with a church. In many excavations archaeologists document hundreds if not thousands of "contexts" and "features," any of which might coincide with a dowsed line. For this reason, attempting to test dowsing on any but the simplest of sites is a bad idea. Yet the authors do not discuss this at all. Thus they have no yardstick against which to decide whether the tests do or do not support the hypothesis that dowsing works, and are forced to operate at a much simpler level, namely that of accumulating instances of negative or positive evidence, "hits" and "misses."

They then go about redefining the test parameters such that the prior probability of a "hit" grows whereas that of a "miss" decreases. If they do not find a foundation interface where one is indicated by the dowser, and they cannot convince themselves that a foundation had been there in the past, they simply disregard the dowser's interpretation. No foundation at Kyloe? No problem, there is a weak and deep interface which will serve to count this as a hit and to double as evidence for the high quality of the dowsing response. The reverse also happens. Found a major stone feature at Newcastle where none had been predicted (62)? No problem, the dowser had been "targeting" foundations (88) and was therefore insensitive to other types of features. Never mind that these hypotheses contradict each other. . . .

But of course the most infamous example of this type of reasoning is the "imprint" hypothesis, whereby dowsers locate features that have been *totally* destroyed (as at Ponteland) or otherwise removed. In one case the authors argue that the dowsers had picked up the imprint of wooden plinths that had been removed (67–70, see Figure 7). They are aware of the danger of using such an argument (88ff) yet feel that it is

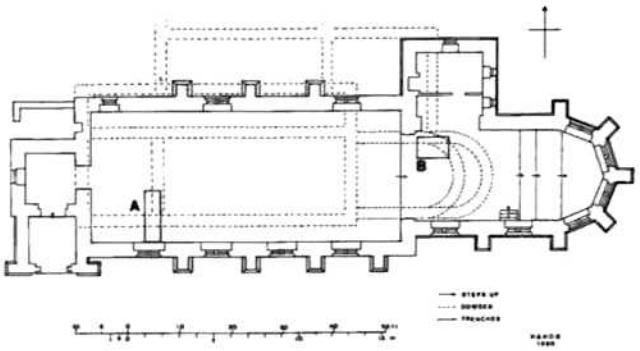


Figure 6a: Plan of St. Nicholas' Church, Kyloe, with dowsed features indicated in dashed lines. Trenches A and B were dug to confirm the presence of two junctions of the dowsed wall foundations. Nothing was found in trench A. Bailey et al. claim a 'hit' was scored in trench B. After Bailey et al. 1988, figure 10.

admissible if the former existence of the feature can be proved. Of course this would require exactly the kind of evidence that the authors specifically excluded at the outset—visual, documentary, or general plausibility!

By such means, the authors extend the range of outcomes they can count as a "hit" until it is hard to think of circumstances that they would be willing to count as a "miss." Basically, *any type of evidence* that indicates the (former) presence of *any type of "interface"* has been ruled admissible, even if it flatly contradicts the dowser's interpretation or has been expressly disallowed by the authors themselves. In the authors' topsy-turvy world, the very weakness or obscurity of the link between evidence and prediction now serves claims of high accuracy and surprising sensitivity—how else could the dowser have picked up, with an accuracy of a few centimeters, some minor feature at a depth of over one meter, or the presence, some decades ago, of some piece of furniture in this very spot?

Subsequent Field Tests

In a more recent trial, Locock (1995) did only slightly better when he arranged for a dowser to map archaeological features alongside existing but back-filled excavation trenches at the historic garden site of Castle Bromwich Hall. The locations of the dowsed points were compared with archaeological and geophysical evidence for the existence of major buried features at those points, and a scoring system applied. Locock recognizes that dowsing "hits" might simply reflect the density of archaeological features on the test site, and he wholly rejects the "imprint" hypothesis. Of a total of nineteen points so tested, six were found to have been located close to major buried features, four were "within 1 meter of some change in buried deposits," and nine were not located near any buried feature.

To assess the significance of these results, one needs to know what experimental controls were in place. Did the dowser have access to visual or historic clues to the location of buried features? We are told that the dowser had previously worked on several other historic garden sites; and he successfully located three iron pergola posts; would a pergola not be located in a predictable position (south-facing, parallel or at right angles to existing buildings and walls)? The other three "hits" were points close by a large masonry culvert that ran across a lawn otherwise free from buried features. The dowser also located two incorrect points there. Without knowing the relative sizes of the lawn and the culvert we simply don't know whether this represents a significant deviation from random chance.

Figure 6b: Excavation plan for trench B at St. Nicholas' Church, Kyloe. The arrows indicate the edges of the dowsed nave foundation. On the basis of the stones found at a depth of over one meter in this very small (just over one square meter) trench, Bailey et al. claim that the dowser 'accurately located the inner line' of the nave. After Bailey et al. 1988, figure 11.

It is clear that Locock, like Bailey et al., is not aware of some of the pitfalls involved in deciding whether a particular outcome is statistically significant. He states that the test produced "evidence suggesting that [dowsing] performed better than random selection for metal objects, but not for old soil disturbance or some masonry features." This is equivalent to having a hundred people flipping coins, selecting the few who, according to chance, will have flipped a lot of heads, and then claiming these "perform better than random in picking heads."

Painful Lessons

There is a lot to be learned from these failed attempts at proving the reality of archaeological dowsing. They highlight the unfamiliarity of archaeologists with formal test design and the uncontrollable nature of archaeological test environments.

The core of the problem, I believe, is the complexity of real-

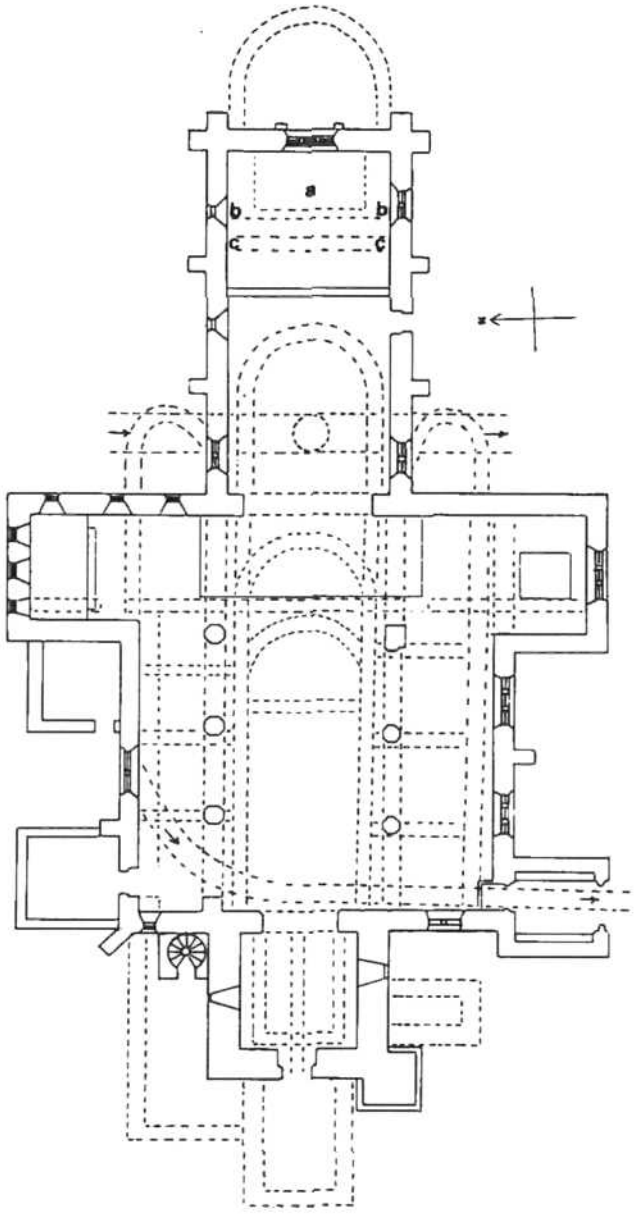


Figure 7a: Plan of St. Mary's Church, Ponteland, with dowsed features indicated in dashed lines. Note dowsed feature A near the altar. After Bailey et al. 1988, figure 17.

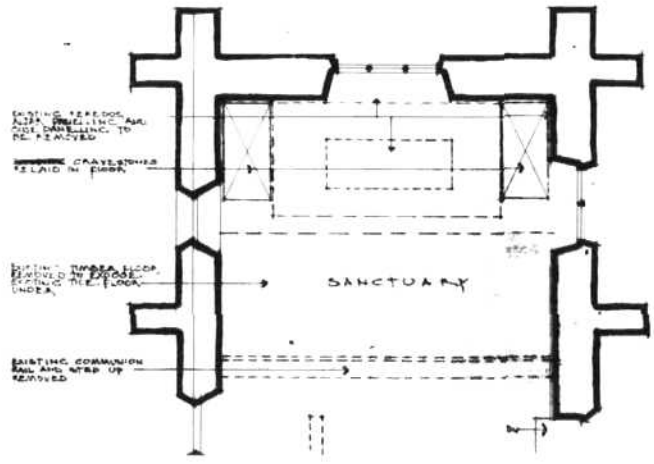


Figure 7b: Architect's plan for the altar area of St. Mary's Church, dating to 1972. Bailey et al. used this documentary evidence for the former presence of a wooden altar platform to argue that the dowser had been picking up an 'imprint' when mapping feature A. After Bailey et al. 1988, figure 18.

life archaeological environments, which makes the design of good tests almost impossible. The main effect here is the very high probability of a "hit" especially when the exact criteria for a hit are left undefined. Another consequence is the difficulty of producing, from a small observation trench, a reliable plan of the archaeological features. Bailey et al. employed a series of generally very small interventions from which they claim to be able to extract exact directions, curves, and angles of linear features—there must be some doubt as to whether it is in fact possible to do this to the required accuracy.

The second reason for failure is a basic lack of understanding among archaeologists, due in part to their lack of education in these areas, about the nature of proof and probability, and the importance of controlled test conditions. I have already discussed some examples of this; one more will serve to drive the point home. Among the three sources of extraneous information mentioned by Bailey et al.—visual and documentary evidence and general plausibility—the one most difficult to exclude from experiments is that of general plausibility.[3] If the dowser produces a plan typical of Norman churches, how do we know that he is not simply proceeding from his general knowledge of such plans? In fact, if one looks at the thirty or so church plans included in an appendix to *Dowsing and Church Archaeology*, it is quite clear that a pattern was adhered to by the medieval architects and builders. The evolution of church buildings generally proceeds along a limited number of possible lines occurring in certain roughly datable waves. For instance, extensions of the main church building *at the apsidal end* are fairly common. This makes it very difficult to assess the dowser's performance should he have correctly dowsed such a buried feature.[4]

The same problem bedevils Locock's attempts to establish whether his dowser's performance was above chance. As I have argued above, this problem can be avoided only by giving absolute priority to control of the test environment, either by restricting the test to one isolated archaeological phenomenon (as in Aitken 1959) or by creating an artificial test environment (as in Randi 1979; see also König et al. 1996). Simple tests such as these have unambiguous outcomes, whereas messy ones are open to wildly divergent interpretations. Where tests cannot be carried out under such restrictions, various simple ploys can be used to avoid the more obvious pitfalls. For example, blindfolding the dowser can eliminate many extraneous effects that otherwise complicate or even invalidate field tests.

Conclusions

At the core of it all, as always, there is the "will to believe."

Belief in dowsing, despite the protestations of its adherents, is not a rational matter. The question of dowser's sensitivity to weak magnetic fields is a case in point. As we have seen, the *a priori* argument for such sensitivity is extremely tenuous. In tests, Aitken (1959) reached a negative conclusion while Locock (1995) was rather more positive. So what? Perhaps Aitken's dowser was not very good, or had a bad day. Who knows? However many times one would prove that a particular dowser could not perform above chance level, their number will always be far outweighed by myriad anecdotes to the contrary. This is the old "proving a negative" problem—somewhere, sometime, there may be someone who is sensitive to weak magnetic fields. . . .

Such an attitude is of course easier to maintain if one does not investigate dowsing too closely—and indeed, given the claims put forth by some archaeologists there is a surprising lack of enthusiasm for studying dowsing in a manner similar to other noninvasive prospecting techniques. Although the danger to their reputations may be one reason, I would suggest here that, paradoxically, most archaeologists judge that investigating dowsing is not a good use of their time, because in essence they see it as a *supernatural* phenomenon! This is not a reason for rejecting it—instead, it puts dowsing beyond the pale of scientific pursuit. In seeing no conflict, academically trained archaeologists are no different from the rest of us. We tend to apply logic and reason to some areas of our lives, while happily suspending skepticism in others. Academic training is of little or no relevance here.

The impact of the Internet as a new and easily available information source is as yet unclear. Will the accessibility and "authority" of Web pages lead to a further growth of public faith in paranormal claims? One obvious route for this to happen will no doubt be through journalists who are strapped for time when doing background searches. Scientists should counter this by providing Web pages that offer quality information to the public (Van Leusen 1996).

It is clear that archaeologists have not yet come to terms with dowsing. Where it has been the subject of tests, the tests have been so poorly designed and executed that any conclusion whatsoever could have been drawn from them. The fact that such tests are usually carried out only by researchers with a prior positive view of dowsing means that the conclusions will likely also be positive. The normal processes of peer review and scholarly discussion have also failed to uncover the lack of properly controlled test conditions in such studies as those of Bailey et al. and Locock, causing a generation of students and general readers in the United Kingdom, at least, to remain under the impression that the reality of archaeological dowsing had been all but confirmed by science.

Acknowledgments

I am grateful for the permission from Intercept Ltd. publishers of *Dowsing and Church Archeology*, to use figures from the book. I would also like to express my thanks to Kenneth Feder of Central Connecticut State University, who supplied me with most of the materials relevant to the U.S. public and suggested several improvements to this article. Any remaining errors and omissions are of course my own.

Notes

1. For example, one such unreported test was recently conducted on behalf of a popular U.K. television series that deals with "paranormal" phenomena. The test involved dowsing over an undisputed Roman villa whose plan had been determined by geophysical techniques. The dowsing was carried out "blind," although the dowsers were informed as to the likely nature of the targets. When no correlation was found, it was revealed that this result was of no interest to the viewing public (C. Gaffney, pers. comm.).

2. This ability to detect imprints is reminiscent of the above-ground "electro-magnetic photo field" detected at one time by Karen Hunt in her dowsing surveys of vanished buildings (see Plummer 1991).

3. And given its importance in preserving and passing on knowledge about the past, one might add oral history to this list.

4. An important property of the archaeological record not often estimated at its correct value by nonarchaeologists is its highly structured nature. Archaeological sites are distributed nonrandomly in the landscape and features are distributed nonrandomly in the site. This predictability makes testing in real-world situations very difficult because an unknown proportion of "hits" may result from general knowledge of the type of site and feature that may be expected to occur in the test area. The flip side of this is the profusion of individual archaeological features found at many sites, each of which could serve as the object of an unspecified dowsing "prediction." Neither can be controlled unless very specific, or better yet, artificial, test conditions are selected.

References

Archaeological Data Service. Forthcoming. *Guide to Good Practice in Air Photography and Remote Sensing Data Handling*. York: Archaeological Data Service.

Aitken, M. J. 1959. Test for correlation between dowsing response and magnetic disturbance. *Archaeometry* 2:58–9.

Bailey, R. N., E. Cambridge, and H. D. Briggs. 1988. *Dowsing and Church Archaeology*. Wimborne: Intercept.

Clark, A. 1996. *Seeing Beneath the Soil: Prospecting Methods in Archaeology*. 2nd ed. London: Batsford.

Clark, K. 1996. http://avebury.arch.soton.ac.uk/CourseNotes/Yr3HandBk.html. *Southampton Archaeology—Student Handbook—3rd Year Students, Geophysical Survey Practical*.

Cole, J. R. 1980. Cult archaeology and unscientific method and theory. In M. B. Schiffer (ed.), *Advances in Archaeological Method and Theory* 3:1–33.

El-Baz, F. 1997. Space age archaeology. *Scientific American* 277 (2):40–45.

Feder, K. L. 1984. Irrationality and popular archaeology. *American Antiquity* 49 (3):525–541.

Gaffney, C., J. Gater, and S. Ovenden. 1991. *The Use of Geophysical Techniques in Archaeological Evaluations*. IFA Technical Paper 9. Birmingham: Institute of Field Archaeologists.

Graves, T. (ed.) 1980. *Dowsing and Archaeology*. Wellingborough: Turnstone Books. Reviewed in *Antiquity* 58:231–2.

Greene, K.T. 1983. *Archaeology: an Introduction*. London: Batsford.

Hancock, P.A. 1998. Dowsing the Rollrights. SKEPTICAL INQUIRER 22 (1): 32–37.

König, R., J. Moll, and A. Sarma. 1996. The Kassel dowsing test. *Swift* 1(1):3–8.

Locock, M. 1995. The Effectiveness of Dowsing as a Method of Determining the Nature and Location of Buried Features on Historic Garden Sites. *Archaeological Prospection* 2 (1995):15–18.

Noël Hume, I. 1969. *Historical Archaeology*. New York: Knopf.

Plummer, M. 1991. Locating invisible buildings. SKEPTICAL INQUIRER 15(4):386–397.

Rahtz, P. 1985. *Invitation to Archaeology*. Oxford University Press.

———. 1988. Review of Bailey et al., *Dowsing and Church Archaeology*, *Antiquity* 62:808–9.

Randi, J. 1979. A controlled test of dowsing abilities. SKEPTICAL INQUIRER 4(1):16–20.

Van Leusen, P.M. 1996. http://www.let.rug.nl/arge/Themes/fringe.html. *Martijn van Leusen's Fringe Archaeology page*.

Weymouth, J.W. 1986. Geophysical methods of archaeological surveying. In Schiffer, M. B. (ed.), *Advances in Archaeological Method and Theory* 9:311–395. Orlando: Academic Press.

Wilcock, J. n.d. http://zenon.inria.fr:8003/agos/sis/dowsing/dowsdean.html. *The use of dowsing for the location of caves, with some results from the first Royal Forest of Dean Caving Symposium, June 1994*.

Williamson, T. 1987. A sense of direction for dowsers? *New Scientist* 113 (19 March 1987):40–43. □

Hidden Messages in DNA?

"Hidden messages" can be found in any text source, including the DNA code, whose four letters A, C, G, and T display certain patterns. However, the claimed DNA messages have trivial explanations and also emerge in artificial (randomly generated) DNA sequences.

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and
C. ARIS CHATZIDIMITRIOU-DREISMANN

The Bible has been claimed by Michael Drosnin to contain "hidden messages," described in his book *The Bible Code* (1997). Other investigators have shown that "messages" can be found in virtually any text source (Thomas 1997). A recent letter to the editor of SKEPTICAL INQUIRER (Pickover 1998) jokingly proposed that the text programs might even detect "hidden messages" in genetic sequences (DNA) of living organisms. Such analyses have been in fact performed during the past few years and, indeed, "hidden messages" or patterns were reported to exist. We here summarize these claims as well as re-analyses that show that the patterns ("messages") either have previously known trivial biological explanations or that they can

be found also in artificial (i.e., computer-generated) DNA sequences. This implies that these patterns are simply mathematical artifacts. Thus, no new "hidden messages" have been revealed to exist in DNA.

Genes of animals, particularly higher animals such as vertebrates, have been known since 1977 to consist of one or several coding parts interrupted by noncoding parts called introns. The major portion of the coding parts can be directly translated to structural information for protein through the genetic code of triplets (e.g., TGG for the amino acid tryptophan). The non-coding parts (introns), on the other hand, are removed from the blueprint copy of the gene (called mRNA) that is used for protein synthesis.

Programs for analyses of natural and artificial languages have been developed since the 1940s, by Zipf (1949) and by Shannon and Weaver (1949) among others. In short, these mathematical methods make statistics to look for correlations between word frequency and word length (see box for details). Since in DNA there are not well-defined separated words, different groupings of n DNA bases (e.g., n=3 or 4 or 5, etc.) were considered as "words." The intriguing claims of the language analyses of DNA (published in prominent scientific journals; see Mantegna et al. 1994 and also Flam 1994) were the following:

a) Applying the Zipf method, Mantegna et al. 1994, claimed to have found language-like relationships also in noncoding DNA of living organisms, e.g., the introns, which are not used by living cells to generate functional cellular components.

b) Applying the Shannon method, the same authors claimed to have found that the noncoding DNA exhibits a considerable amount of language-like redundancy. Moreover, protein-coding DNA seems to exhibit much less such redundancy.

To summarize, the authors of these findings claimed to have discovered a new "information" in natural noncoding DNA that biologists had been unaware of until now!

To investigate these claims and findings, we performed some specific and mathematically simple control analyses.

First, we asked whether random-generated sequences might display similar linguistic properties, as defined by the language programs. In particular, we produced artificial (computer-generated) random DNA sequences having identical length and similar base composition with some given natural DNA sequence in the language tests. We found that the random sequences were indistinguishable from the associated natural genomic DNA sequences.

Second, we checked whether the Shannon method was able to detect the information that is known to be contained in protein coding DNA, i.e., the well known triplet code mentioned above (word length n = 3). The Shannon test was completely unable to discern this information. Thus, this language test detects no message in noncoding DNA that is different from random sequences, and it fails to detect the known information content of genes. (See article by Chatzidimitriou-Dreismann et al., 1996, for details and references.) Similarly, as in the context of the Zipf method, the Shannon method did not succeed in discriminating between a natural DNA sequence and all associated computer-generated artificial sequences.

Our comparisons of natural with random (artificial) DNA sequences clearly show that the aforementioned intriguing "linguistic" findings are mathematical artifacts being trivially caused by varying base-composition in natural DNA sequences. These compositional variations constitute the so-called patchiness of natural DNA, the existence of which is already well known and has multiple biological explanations that are completely compatible with, and a simple consequence of, the evolution of genomes over four billion years.

Summarizing the preceding findings and results one can safely say that the "linguistic" mathematical investigations under consideration did not reveal any new "information" in (coding or noncoding) DNA of living organisms, and that the findings claiming the opposite have trivial causes—at least from the viewpoint of molecular biology. These examples also emphasize the importance of performing appropriate control analyses.

The Zipf Procedure and Shannon Method

The Zipf procedure—as applied to some text of a language—determines the relative occurrence p of all words of length n (i.e., having n letters), for some fixed value of n (e.g., n=6), and then orders all different words according to their p value. This ordering is called "ranking," r. It was found empirically that the graph of the logarithm of p ($\log p$), over the logarithm of r does exhibit a linear relationship. This observation is considered to somehow reflect the fact that natural languages contain "information" (i.e., their words and combinations thereof have "meaning"), because random sequences of letters seem to exhibit that linear relationship in much less degree.

The Shannon method mentioned in the text determines the relative occurrence p of words of length n and builds up the sums $H(n) = \sum p \log p$, where the sum is taken over all words of this length n. Shannon showed in the 1940s that $H(n)$ (for n=1,2,3, . . .) is associated with "information" as well as "redundancy." The latter quantity may be considered an important property of natural languages, the purpose of which is to preserve the meaning of a word in the case of "typographical" errors.

References

Chatzidimitriou-Dreismann, C. A., R. M. F. Streffer, and D. Larhammar. 1996. *Nucleic Acids Research* Vol. 24, 1676–1681.

Drosnin, M. 1997. *The Bible Code.* New York: Simon and Schuster.

Flam, F. 1994. *Science* Vol. 266, 1320.

Larhammar, D. and C. A. Chatzidimitriou-Dreismann. 1993. *Nucleic Acids Research* Vol. 21, 5167–5170.

Mantegna, R. N. et al. 1994. *Physical Review Letters,* Vol. 73, 3169–3172.

Pickover, C. A. 1998. SKEPTICAL INQUIRER March/April, p. 64.

Shannon, C. E. and W. Weaver. 1949. *The Mathematical Theory of Communication.* Urbana, Illinois: Univ. of Illinois Press.

Thomas, D. E. 1997. SKEPTICAL INQUIRER November/December 31–36.

Zipf, G. K. 1949. *Human Behavior and the Principle of Least Effort.* Cambridge, Massachusetts: Addison-Wesley Press. □

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The Real Chief Seattle Was Not a Spiritual Ecologist

Chief Seattle's 1854 Speech is widely accepted as demonstrating the superiority of Native American attitudes toward the environment. However, the chief never made the speech attributed to him.

WILLIAM S. ABRUZZI

Many books have been published during the past several decades promoting the widely accepted belief that all Native Americans lived in "balance" with their environment prior to the coming of the white man. The belief also holds that American Indians possess a deep respect for and spiritual awareness of nature that has been lost by those who live in urban industrial societies with their emphasis on the exploitation of nature for commercial and material gain (e.g., Neihardt 1932; Brown 1953; Waters 1963; Lame Deer and Erdoes 1972; Storm 1972; Deloria 1973; Highwater 1981; Jeffers 1991). One particular publication stands out for its popularity, its inspirational message, and its widespread acceptance as illustrating Native American

spiritual values in relation to the natural environment. This is "Chief Seattle's 1854 Speech" (see Kaiser 1987; Adams 1994; Low 1995). Although the speech attributed to Seattle is widely believed to have been given by him, it is, in fact, pseudo-historical.

Chief Seattle's 1854 Speech

> How can you buy or sell the sky? The land? The idea is strange to us. If we do not own the freshness of the air and the sparkle of the water, how can you buy them? Every part of this earth is sacred to my people. Every shining pine needle, every sandy shore, every mist in the dark woods, every meadow, every humming insect. All are holy in the memory and experience of my people....
>
> If we sell you our land, remember that the air is precious to us, that the air shares its spirit with all the life it supports. The wind that gave our grandfather his first breath also received his last sigh. The wind also gives our children the spirit of life. So if we sell you our land, you must keep it apart and sacred, a place where man can go to taste the wind that is sweetened by the meadow flowers.
>
> Will you teach your children what we have taught our children? That the earth is our mother? What befalls the earth befalls all the sons of the earth.
>
> This we know: the earth does not belong to man, man belongs to the earth. All things are connected like the blood that unites us all. Man did not weave the web of life, he is merely a strand in it. Whatever he does to the web, he does to himself.
>
> One thing we know: Our God is also your God. The earth is precious to Him and to harm the earth is to heap contempt on its Creator. (Gore 1992, 159)

The above quote is taken from Vice President Al Gore's book, *Earth in the Balance: Ecology and the Human Spirit.* It is part of a larger 1,200-word speech attributed to Chief Seattle, a nineteenth-century Suquamish Indian of the American Northwest. The speech has been widely used not only to illustrate Seattle's poetic appreciation of nature and his deeply spiritual understanding of the interconnectedness of all living things, but also to emphasize the ancient wisdom contained within Native American cultures generally—a wisdom many view as lost in the highly technical and materially oriented urban industrial societies of the late twentieth century. However, there is a fundamental problem with the above quote, as well as with the larger speech from which it is taken: not only were the words never spoken by Chief Seattle; they could not possibly have been.

The current version of Chief Seattle's speech represents but the latest rendition of a changing and evolving work of fiction. The original text of this speech was written by Dr. Henry A. Smith and published in the *Seattle Sunday Star* on October 29, 1887 (Kaiser 1987, 503). Smith claimed that the text he published was a direct copy of a speech given by Chief Seattle in 1854 during treaty negotiations with Isaac Williams, Washington State's first territorial governor. Increasingly modified versions of Seattle's speech were subsequently published by Clarence Bagley (1931), John Rich (1932), and William Arrowsmith (1969).

The most far-reaching revision of Seattle's speech was created in 1991 by Ted Perry, a Texas scriptwriter. Perry composed a substantially modified and enlarged version of the previously evolving Seattle speech to accompany a program on ecology produced by the Southern Baptist Radio and Television Commission.[1] Perry's script departed sharply from all previous versions of Seattle's speech (see Kaiser 1987) and soon spawned its own various offspring, including 1) an abbreviated version of his 1971 script distributed at the 1974 Spokane Expo; 2) an anonymous booklet titled *The Decidedly Unforked Message of Chief Seattle* (see Adams 1994, 52); 3) an anonymous 1991 revision of the 1974 Spokane text titled "This Earth is Precious" and 4) a poetic adaptation of the original Perry script published in the Midwest Quarterly in 1992 under the title, "Chief Seattle Reflects on the Future of America, 1855" (see Low 1995, 410).

In 1991, a further modification of Perry's script provided the text for a children's book titled *Brother Eagle, Sister Sky* illustrated by Susan Jeffers. Jeffers assumed credit only for the illustrations that she produced for the book; she attributed the text itself to Chief Seattle. Ironically, Jeffers's book, which sold more than 250,000 copies, was listed as number five on the *New York Times* bestsellers list for nonfiction in 1992 (Bordewich 1996, 132). That same year, The Nature Company advertised a small book in its Christmas catalogue titled *Chief Seattle's 1854 Speech* (see Low 1995, 407).

Chief Seattle's speech—or, more correctly, various embellishments of Ted Perry's fictional script—quickly gained broad acceptance throughout the industrial world. In one form or another, different versions of "Chief Seattle's Speech" have served a wide variety of public uses. The "speech" provided the basis for a multimedia teaching aid produced by the United Society for the Propagation of the Gospel in London, as well as a prayer used by the Woman's Day World of Prayer (Kaiser 1987, 498). Portions of Perry's script have also been published in *Passages* (Northwest Airlines' in-flight magazine), *Environmental Action,* numerous Sierra Club editorials, Canada's "Green Plan," and NASA's "Mission to Planet Earth" (see Kaiser 1987, 498–500; Adams 1994, 52). Joseph Campbell incorporated the Spokane text in his book *The Power of Myth,* with Bill Moyers (1988), and subsequently read from the text in his video series, *Transformation of Myth through Time.* And, as illustrated above, the Vice President of the United States included a portion of Seattle's mythical speech in his book calling for increased global ecological awareness (Gore 1992). Far too many additional adaptations of Seattle's "speech" exist than can be listed here, including its ubiquitous application on T-shirts, buttons and other items sold at innumerable folk festivals, art galleries, and New Age spiritual gatherings. However, it is worth noting that excerpts from Seattle's "speech" have even found their way into scholarly publications about American Indians (e.g., Thornton 1987, 225), as well as into at least two environmental science textbooks (e.g., Collard 1989; Dobson 1995).

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Improbabilities Associated with Seattle's "Speech"

A critical evaluation of the full "modern text" of Chief Seattle's speech (i.e., the collection of texts derived from Perry's script) clearly demonstrate its inauthenticity. It is, for example, impossible for Seattle to have made the statement, "I have seen a thousand rotting buffaloes on the prairie left by the white man who shot them from a passing train," which is contained within the "modern text" (Kaiser 1987, 527). First of all, it would have been impossible for any single person to have witnessed one individual shoot anywhere near one thousand buffalo from a passing train, given the speed of a train combined with the time that would have been needed for an individual to reload and fire a rifle in use in 1854 that many times. There also were no buffalo at the Puget Sound where Seattle lived, which is over a thousand miles from the Great Plains, and there is no evidence even suggesting that Seattle ever traveled to the Great Plains. Furthermore, the transcontinental railroad was not completed until 1869, and the Euroamerican bison slaughter did not begin until the 1870s. Since Seattle gave his speech in 1854, a full fifteen years before the railroad was completed and nearly twenty years before whites began to slaughter buffalo in large numbers, he could not possibly have commented on it in his speech. Finally, and most important, Seattle died in 1866 (Kaiser 1987, 502). It would, therefore, have been very difficult—need I say impossible!—for the chief to have witnessed an event that occurred after his death.

Chief Seattle's speech—or, more correctly, various embellishments of Ted Perry's fictional script—quickly gained broad acceptance throughout the industrial world.

The modern version of Seattle's speech also contains the quote, "What is there to life if a man cannot hear the lovely cry of a whippoorwill?" (Kaiser 1987, 527). Since the whippoorwill, like the buffalo, is also not native to the Northwest, Seattle is unlikely to have ever heard one sing. Similarly, the modern text contains a reference by Seattle to the white man's urban pollution. However, since Seattle's speech was made as part of the negotiations for the initial purchase of Indian land, he could not have commented on developments that were to follow the very land transfer he was negotiating.

All modern versions of Chief Seattle's speech are, therefore, completely inauthentic. Indeed, given the fictional nature of Perry's script and the fact that all modern versions of Seattle's speech derive from his original text, all of the latter are, by definition, themselves works of fiction. However, there are also numerous problems associated with the original text that Henry Smith wrote in 1887, which raise serious doubts about its authenticity as well. To begin with, Smith's text was published a full thirty-three years after Chief Seattle gave his original speech. This separation in time alone raises serious questions regarding the text's accuracy and reliability, much as the 30 to 100-years gap between the death of Jesus and the writing of the various gospels have raised serious doubts regarding the authenticity of specific words attributed to him.

Furthermore, Seattle spoke no English and his speech was given in Lushotseed (a Salish dialect), his native tongue, which was then translated into Chinook Jargon. Chinook Jargon was a regional trading language containing an admixture of French, English, and local Indian words. It contained approximately 300 words and has been described as "barely suitable for bartering" (Adams 1994, 53). Given its verbal limitations, it is highly unlikely that Chinook Jargon could express the abstract conceptual images contained in Smith's version of Seattle's speech, including such statements attributed to Seattle as "Yonder sky that had wept tears of compassion upon our fathers for centuries untold . . ." (see Kaiser 1987, 503). Moreover, the scene set by Smith in his version of Seattle's speech was described too melodramatically to represent an objective historical account. Smith wrote that "Chief Seattle arose with all the dignity of a senator who carries the responsibility of a great nation on his shoulders" (ibid.). Finally, Kaiser (ibid., 506) shows that substantial differences exist between the original Smith text and two short treaty speeches attributed to Seattle in the National Archives and concludes that "the selection of the material and the formulation of the text is [sic] possibly as much Dr. Smith's as Seattle's."

The Real Chief Seattle

Due to cumulative changes in the content of the speech attributed to him over the past 150 years, Chief Seattle has been transformed from a local Suquamish Indian into a late Victorian version, and more recently into a modern environmentalist version, of the "noble savage." Through time and textual revision, Seattle has been completely removed from the nineteenth century sociopolitical context in which he lived. He has, instead, been fashioned and refashioned into successive, politically correct versions of the white man's Indian. Since Seattle presented his speech during preliminary treaty negotiations with Isaac Williams, the new territorial governor, it must be understood within that context.

Seattle's original speech was made as part of an argument for the right of the Suquamish and Duamish peoples to continue to visit their traditional burial grounds following the sale of land to white settlers. The specific land that was purchased by whites was sacred to the Suquamish and Duamish because their ancestors were buried there. It was this specific land that was sacred, not land as an abstract concept. It is whites who have created the romantic notion that all land is sacred to Indians.

The very fact that Seattle was chosen by the U.S. Government to represent his people in treaty negotiations raises important questions. Why, for example, was Seattle chosen and not someone else? The Northwest peoples were orga-

nized into a variety of clans and possessed no centralized leadership or political organization. However, as in other situations where colonial governments encountered land occupied by tribal societies, the United States Government needed friendly leaders to serve as representatives for the various indigenous peoples of this region. Chief Seattle was one of the local leaders chosen for that purpose. Seattle was likely selected because he demonstrated allegiance, rather than opposition, to whites. He had, in fact, converted to Roman Catholicism around 1830 (Kaiser 1987, 503) and was positively disposed toward white settlement. Seattle never fought a war against the Americans and even sided with them during one Indian uprising, an uprising he blamed on Indian youth (Adams 1994, 52–53). He was, significantly, the first Indian to sign the 1855 treaty. Finally, two statements in the original treaty speeches found in the National Archives clearly attest to Seattle's positive disposition towards whites:

"Now by this we put away all bad feelings, if we ever had any. We are friends of the Americans.

I look upon you as my father. I and the rest regard you as such. All of the Indians have the same good feelings towards you." (Adams 1994, 52–53)

Seattle was not simply a pawn of the U.S. Government in this situation, however. He needed whites to protect and advance his own economic and political interests. Seattle was commercially allied with a Dr. David Maynard in the curing and packing of salmon (Adams 1994, 53) and needed whites to help him in his conflict with other native leaders for control over fishing rights essential to his newly developing commercial venture. In one of the original treaty speeches preserved in the National Archives, Seattle refers to the U.S. Army as a "bristling wall of strength," which will assure that "ancient enemies will no longer frighten his people" (ibid.). Seattle was therefore likely using whites to advance his own political and economic interests, just as they were using him to advance theirs.

Stereotyping Native Americans

Although on the surface it may not appear harmful to portray Chief Seattle and other Native Americans in idealistic terms, such romantic portrayals are incorrect and serve to perpetuate racial stereotypes. They deny American Indians their diversity and adaptability. While it may be an improvement to project stereotypes of sainted elders rather than brutish savages, as Alice Kehoe (1992, 591) points out, "neither mythic projection reflects the reality of the one-and-one-half million Native Americans who grew up as Indians."

The way in which stereotypes rob Native Americans of their humanity and diversity is clearly illustrated in Susan Jeffers's book, *Brother Eagle, Sister Sky.* Jeffers states on the original jacket cover of her book that she "consulted with Native Americans, especially with members of the Lakota Sioux Nation" in the writing and illustrating of her book, even though Chief Seattle was not a Sioux. Jeffers's illustrations are all of the Lakota. The cultural context of her book is, thus, entirely Plains Indian, the "classic" American Indian of Hollywood and the environmental movement. Not one of her illustrations is of the Suquamish or Duamish peoples of the Northwest, the authentic cultural context of Chief Seattle. Moreover, when confronted by a *New York Times* reporter regarding the inauthenticity of the text attributed to Seattle in her book, Jeffers replied, "I don't know what he said. But I do know that the Native American people lived this philosophy, and that's what's important" (Bordewich 1996:133). Writers such as Jeffers, who uncritically accept such romantic portrayals of Native Americans and who fail to distinguish between one Indian group and another, communicate, however unintentionally, the notion that all Indians are the same.

Conclusion

During the past three decades, Chief Seattle has emerged as one of the premiere icons of Native American values for many whites. Unfortunately, however, the Chief Seattle known to most people is mostly fictional, a fabrication by and for whites. This creation of a false Indian stereotype is hardly new. Throughout American history, whites have fabricated Indians into images that served their own interests. During the nineteenth century, when the Euroamerican population of the United States grew rapidly and whites came into direct competition for land with Native Americans, Indians were popularly viewed as savages who needed to be tamed, settled, and civilized—and even removed, if necessary. Once Indian independence and sovereignty were eliminated and the bulk of the native population was placed on reservations, Indians became viewed nationally as children unable to manage their own affairs and needful of white supervision. White-run government agencies were, thus, established to administer Indian reservations, to establish reservation development policies, and to negotiate contracts with industrial corporations doing business on Indian land. This paternalistic policy served white interests more than it served Indian interests and frequently hindered Native American economic development.

More recently, with the growth of large environmental and countercultural New Age movements, a new Indian image has emerged. Native Americans have become the repositories of a traditional wisdom to those challenging institutionalized beliefs and practices in contemporary industrial societies. It is in this context that Chief Seattle has emerged as the modern icon of Native American environmental wisdom and spiritual values. However, as with past Indian stereotypes serving white interests, the current popular images of Chief Seattle represent yet another white fiction. Significantly, each new version of Seattle's speech, beginning with that of Dr. Henry Smith and ending with the latest reincarnation of Ted Perry's script, has been created entirely by non-Indians. Not one Native peoples has translated Seattle's speech into their own indigenous language (Low 1995, 416).

Native Americans have adapted historically to an impressive diversity of environments in both interesting and creative ways. A careful study of Native American ecology, thus, offers us an opportunity to further understand the processes by

which humans adapt—or fail to adapt—to the natural environment around them. It also offers an opportunity to apply the theoretical principles of human ecology to the indigenous populations of North America and to compare developments here with those that have occurred elsewhere. However, if we want to truly learn from the study of Native American ecology, then our research must be conducted in the same rigorous, empirical manner, and following the same accepted standards of scientific research, that have been applied to all other human populations.

To what extent, for example, were the diversity of Native American subsistence strategies a function of local differences in population/resource relationships and of the demands that such relationships imposed upon food production and distribution? Why, for example, did the peoples of the southeast U.S. live in larger population concentrations than elsewhere in North America, and how was this related to the fact that they were organized into more centralized and socially stratified political systems? Also, what role did resource competition play in the evolution of Indian warfare, be it on the Great Plains, in the northeast woodlands, or along the northwest coast? More specifically, did increasing population growth in the northern Plains following the acquisition of the horse lead to greater warfare due to increased competition over hunting territories and grazing lands? And, most important, how do these and innumerable other developments compare to what has transpired among other peoples on other continents? In other words, to what extent do we see similar ecological processes operating in different parts of the world?

The goal of studying a scientific human ecology is to understand and explain historical and contemporary human environmental relations throughout the world in as objective and parsimonious a manner as possible, free from vested political and ideological biases, and on the basis of solid empirical research. This can be achieved only by adopting a more critical approach to the study of Native American ecology than has been demonstrated by those who have uncritically accepted and promoted the Chief Seattle myth.

Note

1. The Baptists took credit for the speech away from Perry and gave it instead to Seattle by eliminating the "written by" portion of the credits in the film. This caused Perry, who has expressed concern regarding the subsequent embellishments of his script and their presentation as authentic, to break with the Baptist Commission.

References

Adams, R. 1994. Chief Seattle and the Puget Sound Buffalo Wallow. *Borealis* 15:50–54.

Arrowsmith, W. 1969. Speech of Chief Seattle, January 9th, 1855. *Arion* 8:461–464.

Bagley, C.B. 1931. Chief Seattle and Angeline. *Washington Historical Quarterly* 22:243–275.

Bordewich, F.M. 1996. *Killing the White Man's Indian: Reinventing Native Americans at the End of the Twentieth Century.* New York: Doubleday.

Brown, J.E. 1953. *The Sacred Pipe.* University of Oklahoma Press, Norman.

Campbell, J., with Bill Moyers, 1988. *The Power of Myth.* New York: Doubleday.

Collard, A. with J. Contrucci. 1989. *Rape of the Wild: Man's Violence Against Animals and the Earth.* Indianapolis: Indiana University Press.

Deloria, V. 1973. *God is Red.* New York: Dell Publishing Co.

Dobson, A. 1995. *Green Political Thought: An Introduction,* second edition. New York: Routledge.

Gore, A. 1992. *Earth in Balance: Ecology and the Human Spirit.* New York: Houghton Mifflin.

Highwater, J. 1981. *The Primal Mind: Visions and Reality in Indian America.* New York: New American Library.

Jeffers, S. 1991. *Brother Eagle, Sister Sky: A Message from Chief Seattle.* New York: Dial Books.

Kaiser, R. 1987. Chief Seattle's Speech(es): American Origins and European Reception. In: *Recovering the Word: Essays on Native American Literature,* B. Swann and A. Krupat (eds). University of California Press, Berkeley, pp.497–536.

Kehoe, A. 1992. *North American Indians: A Comprehensive Account,* second edition. Englewood Cliffs, N.J.: Prentice Hall.

Lame Deer, J. and R. Erdoes. 1972. *Lame Deer: Seeker of Visions.* New York: Simon and Schuster.

Low, D. 1995. Contemporary reinvention of Chief Seattle: Variant texts of Chief Seattle's 1854 speech. *American Indian Quarterly* 19:407–421.

Neihardt, J. 1932. *Black Elk Speaks: The life of an Oglala Sioux Holy Man.* New York: William Morrow and Company.

Porterfield, A. 1990. American Indian spirituality as a countercultural movement. In: *Religion in Native North America,* Christopher Vecsey (ed.). University of Idaho Press, Moscow, pp. 152–164.

Powers, W.K. 1990. When Black Elk speaks, everybody listens. In: *Religion in Native North America,* Christopher Vecsey (ed). University of Idaho Press, Moscow, pp. 136–151.

Rich, J. 1932. *Seattle's Unanswered Challenge.* Fairfield, Washington: Ye Galleon Press.

Storm, H. 1972. *Seven Arrows.* New York: Ballantine Books.

Thornton, H. 1987. *American Indian Holocaust and Survival: A Population History since 1492.* University of Oklahoma Press, Norman.

Waters, F. 1963. *Book of the Hopi.* New York: Viking Press. □

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Joint Pain and Weather

Despite the widespread belief in weather-related pain, and its acceptance as a real phenomenon by the medical community, how good is the evidence?

DONALD C. QUICK

Almost everyone has heard comments like, "I don't like winter because the cold makes my joints hurt." Or, "There must be rain coming because my knee is acting up." We tend to take these claims matter-of-factly, but the scientific facts aren't at all clear.

I became interested in the topic when I started a research collaboration with a group of orthopaedic surgeons. I had previously been interested in neurophysiology, so I decided to explore the topic of joint pain as a bridge between neuroscience and orthopaedics. It seemed to me that if I could learn more about the links between weather and joint pain, I might be able to use that knowledge to help our patients. I did a skeptic's search of the medical literature (Quick 1997),

and what I found was very intriguing. The people who complain about joint pain associated with bad weather are not restricted to areas with a lot of bad weather to complain about. The belief is also not restricted to any ethnic, cultural, or social group. Even medical doctors believe that the weather can affect joint pain (Hollander 1961, Patberg 1987), which is somewhat surprising because they can't explain why it happens.

Who complains about pain when the weather changes?

60% of people with rheumatoid arthritis (inflammatory joint disease)

80% of people with osteoarthritis (degenerative joint disease)

80% of people with fibromyalgia (rheumatoid muscle pain)

others: low back pain, jaw pain, gout, amputees

Medical journals include many case reports of patients with symptoms that get worse when the weather changes. The most common medical conditions reported to be weather-sensitive are arthritis, lower back pain, and chronic muscle pain. In fact, the medical description for fibromyalgia (rheumatic muscle pain) includes weather-related pain as one of the diagnostic features (Yunus et al. 1981).

Despite the widespread belief in weather-related pain, and its acceptance as a real phenomenon by the medical community, there is no scientific proof that such a thing really exists. It's not that nobody has tried, but the research done thus far is conflicting.

Some studies have found evidence that joint pain is worsened by certain changes in weather, but others have found that there is no effect, or the opposite effect. For example, some groups of researchers report that high barometric pressure causes more joint pain (Guedj and Weinberger 1990), but others claim that high pressure reduces joint pain (Jamison and Parris 1990). This calls into question which report is correct, why the other is incorrect, and whether there are underlying factors that had an effect but weren't considered in the research. More troubling still is that there can be conflicts within a single study, like one that found some patients who felt worse in high humidity while other patients felt better under the same conditions (Laborde et al. 1986).

What kinds of weather are associated with joint pain?

Cold **Rain**

Falling Barometer **Rising Humidity**

Overcast Skies

If weather can indeed influence joint pain, then you would expect that most of the research studies done so far (at least sixteen of them; see references) would pretty much agree with one another. But they don't—not even close.

This leads to the big question: If weather-related joint pain isn't real, why do so many people believe in it? One possible answer is that it's an unconscious psychological process shared by many people (Jamison et al. 1990, 1995). Detailed scrutiny of rheumatoid arthritis offers an example and a lesson.

People suffering from rheumatoid arthritis often have difficulty dealing with the disease psychologically (Affleck et al. 1987). The cause of the disease is unknown, there are no really effective treatments, and there is no cure. This makes it difficult for patients to understand why they are suffering. They ask, Why me? and there is no answer.

Symptoms of rheumatoid arthritis come and go, and the patient tries to pick out the circumstances that may have some effect. Some arthritics believe that their eating habits can influence the likelihood of joint pain. Others try to control their sleeping patterns because pain and stiffness are often worse when they wake up in the morning. Others may interpret morning stiffness as being related to morning coolness or dampness as a regular feature of the weather. Another reason why rheumatoid arthritics may focus on weather is that they know heat therapy can relieve the joint pain for a time, so they assume that cold weather should have the opposite effect.

Blaming their pain on the weather relieves the patient from thinking that he or she can control the episodes of pain by how they sleep, what they eat, and so on. They can't control the weather, so they feel no guilt when the pain comes.

Attitudes like these may develop unconsciously, so the linkage between pain and weather would seem like a simple cause-and-effect relationship. Furthermore, support groups for rheumatoid arthritis could reinforce these ideas if other patients were to express the same beliefs.

Almost all of the scientific studies of weather and joint pain have failed to rule out psychological effects. In fact, it's almost impossible to do. If a research subject believes that cold, for example, causes pain, then there is no way to expose that person to cold without him or her knowing it. And if the subject knows it's cold, that fact alone can trigger the psychological link with pain.

In another twist to the story, some people claim to actually be able to predict weather based on their joint pain (Jamison et al. 1995). To research this phenomenon, it is theoretically possible to eliminate the psychological bias. But to do so, the research subjects would have to be kept from watching television, listening to the radio, and reading newspapers so they

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Microclimate vs. Macroclimate

Macroclimate
is what the Weather Bureau reports

Microclimate
is what your skin experiences, which changes if

1) you are indoors or in a car
2) you wear clothes
3) you are exercising
4) you have gotten wet (e.g., from rain or swimming)
5) your skin has been treated with lotion (e.g., bug spray or sun block)
6) you stay in shady outdoor areas

wouldn't know about the official weather forecasts. They would also have to be kept from learning about the forecasts from other people. If they could then predict the weather in advance, it would prove that their joint pain was sensitive to changing weather conditions. However, this kind of experiment has never been done because it's just not practical to isolate human subjects for long periods.

Only one researcher thus far has succeeded in controlling the psychological element in studies of weather-related joint pain. Dr. J. L. Hollander, at the University of Pennsylvania, achieved this using a climate-controlled chamber, built in the early 1960s (Hollander 1961). In Hollander's experiments, patients with arthritis volunteered to live in the chamber for two weeks or more. The climate inside the chamber—temperature, humidity, atmospheric pressure, air flow, and air ionization—was completely controlled by the experimenter, and the change was made slowly so the occupants wouldn't notice. With this study design, the research subjects were unable to form a psychological link between changes in the weather and changes in how they felt.

In Hollander's experiments, the only weather condition that appeared to have any effect on joint pain was an increase in humidity occurring at the same time as a decrease in barometric pressure (Hollander and Yeostros 1963). This is precisely what happens in nature when a storm is approaching, and it fits well with the fact that many arthritics claim their joints hurt before a storm.

Hollander's work included only a dozen patients, so there is some suspicion that the positive results may have been a fluke—a matter of chance. Nevertheless, the experiment has never been repeated, despite the fact that three decades have passed and there is still no other proof that joint pain may be influenced by weather.

The bottom line in my review of the research literature is that medical science simply does not know whether atmospheric conditions can influence joint pain. People have been complaining of weather causing them pain since the time of Hippocrates, and that is not likely to change any time soon. Furthermore, if a person believes that cold or damp can cause joint pain, then the phenomenon is a *psychological* reality for that person, regardless of whether it is a *scientific* reality. I think it's reasonable to conclude that weather-related pain is not really a medical problem because flare-ups of pain are likely to occur (for unknown reasons) regardless of the weather. More important from my perspective is that it's not a viable medical opportunity because we don't really know the facts and therefore don't have a basis of scientific knowledge from which to build a treatment plan.

References

Affleck, G., C. Pfeiffer, H. Tennen, and J. Fifield. 1987. Attributional processes in rheumatoid arthritis patients. *Arthritis Rheum.* 30:927–31.

Clarke, A.M., and J. Nicholl. 1991. Does the weather affect the osteoarthritic patient? [letter] *Br. J. Rheumatol.* 30:477.

de Blécourt, A.C.E., A.A. Knipping, N. de Voogd, and M.H. van Rijswijk. Weather conditions and complaints in fibromyalgia. 1993. *J. Rheumatol.* 20:1932–4.

Dequeker, J., and L. Wuestenraed. 1986. The effect of biometeorological factors on Ritchie articular index and pain in rheumatoid arthritis. *Scand. J. Rheumatol.* 15:280–4.

Edström, G., G. Lundin, and T. Wramner. 1948. Investigations into the effect of hot, dry microclimate on peripheral circulation, etc., in arthritic patients. *Ann. Rheum. Dis.* 7:76–82.

Guedj, D., and A. Weinberger. 1990. Effect of weather conditions on rheumatic patients. *Ann. Rheum. Dis.* 49:158–9.

Hagglund, K.J., et al. 1994. Weather, beliefs about weather, and disease severity among patients with fibromyalgia. *Arthritis Care Res.* 7:130–5.

Hollander, J.L. 1961. The controlled-climate chamber for study of the effects of meteorological changes on human diseases. *Trans. New York Acad. Sci.* 24:167–72.

Hollander, J.L. 1985 Whether weather affects arthritis. [editorial] *J. Rheumatol.* 12:655–6.

Hollander, J.L., and S.J. Yeostros. 1963. The effect of simultaneous variations of humidity and barometric pressure on arthritis. *Bull. Am. Meteorol. Soc.* 44:489–94.

Jamison, R.N., K.O. Anderson, and M.A. Slater. 1995. Weather changes and pain: perceived influence of local climate on pain complaint in chronic pain patients. *Pain* 61:309–15.

Jamison, R.N., and W.C.V. Parris. 1990. Weather patterns affect chronic pain: Myth or reality? [abstract] *Pain* suppl. 5:S292.

Laborde, J.M., W.A. Dando, and M.J. Powers. 1986. Influence of weather on osteoarthritics. *Soc. Sci. Med.* 23:549–54.

Patberg, W.R. 1987. Effect of weather on daily pain score in rheumatoid arthritis. [letter] *Lancet* (ii):386–7.

Patberg, W.R. 1989. Effect of temperature and humidity on daily pain score in a patient with rheumatoid arthritis. [letter] *Arthritis Rheum.* 32:1627–9.

Patberg, W.R., R.L.F. Nienhuis, and F. Veringa. 1985. Relation between meteorological factors and pain in rheumatoid arthritis in a marine climate. *J. Rheumatol.* 12:711–5.

Potter, J.L., and J.J.R. Duthie. 1961. Effects of environmental temperature upon capillary resistance in patients with rheumatoid arthritis and other individuals. *Ann. Rheum. Dis.* 20:144–8.

Quick, D.C. 1997. Joint pain and weather: A critical review of the literature. *Minn. Med.* 80(3):25–9.

Rasker, J.J., H.J.G. Peters, and K.L. Boon. 1986. Influence of weather on stiffness and force in patients with rheumatoid arthritis. *Scand. J. Rheumatol.* 15:27–36.

Rose, M.B. 1974. Effects of weather on rheumatism. *Physiotherapy* 60:306–9.

Shutty, M.S. Jr., G. Cundiff, and D.E. DeGood. 1992. Pain complaint and the weather: Weather sensitivity and symptom complaints in chronic pain patients. *Pain* 49:199–204.

Sibley, J.T. 1985. Weather and arthritis symptoms. *J. Rheumatol.* 12:707–10.

Van de Laar, M.A.F.J., et al. 1991. Assessment of inflammatory joint activity in rheumatoid arthritis and changes in atmospheric conditions. *Clin. Rheumatol.* 10:426–33.

Yunus, M., et al. 1981. Primary fibromyalgia (fibrositis): Clinical study of 50 patients with matched normal controls. *Sem. Arthritis Rheum.* 11:151–71.

The Ten-Percent Myth

BENJAMIN RADFORD

Someone has taken most of your brain away and you probably didn't even know it. Well, not taken your brain away, exactly, but decided that you don't use it. It's the old myth heard time and again about how people use only ten percent of their brains. While for the people who repeat that myth, it's probably true, the rest of us happily use all of our brains.

The Myth and the Media

That tired Ten-Percent claim pops up all the time. Last year, national magazine ads for U.S. Satellite Broadcasting showed a drawing of a brain. Under it was the caption, "You only use 11 percent of its potential." Well, they're a little closer than the ten-percent figure, but still off by about 89 percent. In July 1998, ABC television ran promotional spots for "The Secret Lives of Men," one of their offerings for the fall season's lineup. The spot featured a full-screen blurb that read, "Men only use ten percent of their brains."

One reason this myth has endured is that it has been adopted by psychics and other paranormal pushers to explain psychic powers. On more than one occasion I've heard psychics tell their audiences, "We only use ten percent of our minds. If scientists don't know what we do with the other ninety percent, it must be used for psychic powers!" In *Reason To Believe: A Practical Guide to Psychic Phenomena,* author Michael Clark mentions a man named Craig Karges. Karges charges a lot of money for his "Intuitive Edge" program, designed to develop natural psychic abilities. Clark quotes Karges as saying: "We normally use only 10 to 20 percent of our minds. Think how different your life would be if you could utilize that other 80 to 90 percent known as the subconscious mind" (Clark 1997, 56).

This was also the reason that Caroline Myss gave for her alleged intuitive powers on a segment of "Eye to Eye with Bryant Gumbel," which aired in July of 1998. Myss, who has written books on unleashing "intuitive powers," said that everyone has intuitive gifts, and lamented that we use so little of the mind's potential. To make matters worse, just the week before, on the very same program, correct information was presented about the myth. In a bumper spot between the program and commercials, a quick quiz flashed onscreen: What percentage of the brain is used? The multiple-choice answers ranged from 10 percent to 100 percent. The correct answer appeared, which I was glad to see. But if the producers knew that what one of their interviewees said is clearly and demonstrably inaccurate, why did they let it air? Does the right brain not know what the left brain is doing? Perhaps the Myss interview was a repeat, in which case the producers presumably checked her facts after it aired and felt some responsibility to correct the error in the following week's broadcast. Or possibly the broadcasts aired in sequence and the producers simply did not care and broadcast Myss and her misinformation anyway.

Even Uri Geller, who has made a career out of trying to convince people he can bend metal with his mind, trots out this little gem. This claim appears in his book *Uri Geller's Mind-Power Book* in the introduction: "Our minds are capable of remarkable, incredible feats, yet we don't use them to their full capacity. In fact, *most of us only use about 10 per cent of our brains,* if that. The other 90 per cent is full of untapped potential and undiscovered abilities, which means our minds are only operating in a very limited way instead of at full stretch. I believe that *we once had full power over our minds.* We had to, in order to survive, but as our world has become more sophisticated and complex we have forgotten many of the abilities we once had" (emphasis in original).

Evidence Against the Ten-Percent Myth

The argument that psychic powers come from the unused majority of the brain is based on the logical fallacy of the argument from ignorance. In this fallacy, lack of proof for a position (or simply lack of

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information) is used to try to support a particular claim. Even if it were true that the vast majority of the human mind is unused (which it clearly is not), that fact in no way implies that any extra capacity could somehow give people paranormal powers. This fallacy pops up all the time in paranormal claims, and is especially prevalent among UFO proponents. For example: Two people see a strange light in the sky. The first, a UFO believer, says, "See there! Can you explain that?" The skeptic replies that no, he can't. The UFO believer is gleeful. "Ha! You don't know what it is, so it must be aliens!" he says, arguing from ignorance.

What follows are two of the reasons that the Ten-Percent story is suspect. (For a much more thorough and detailed analysis of the subject, see Barry Beyerstein's chapter in the new book *Mind Myths: Exploring Everyday Mysteries of the Mind* [1999].)

1) Brain imaging research techniques such as PET scans (positron emission tomography) and fMRI (functional magnetic resonance imaging) clearly show that the vast majority of the brain does not lie fallow. Indeed, although certain minor functions may use only a small part of the brain at one time, any sufficiently complex set of activities or thought patterns will indeed use many parts of the brain. Just as people don't use all of their muscle groups at one time, they also don't use all of their brain at once. For any given activity, such as eating, watching television, making love, or reading SKEPTICAL INQUIRER, you may use a few specific parts of your brain. Over the course of a whole day, however, just about all of the brain is used at one time or another.

2) The myth presupposes an extreme localization of functions in the brain. If the "used" or "necessary" parts of the brain were scattered all around the organ, that would imply that much of the brain is in fact necessary. But the myth implies that the "used" part of the brain is a discrete area, and the "unused" part is like an appendix or tonsil, taking up space but essentially unnecessary. But if all those parts of the brain are unused, removal or damage to the "unused" part of the brain should be minor or unnoticed. Yet people who have suffered head trauma, a stroke, or other brain injury are frequently severely impaired. Have you ever heard a doctor say, ". . . But luckily when that bullet entered his skull, it only damaged the 90 percent of his brain he didn't use"? Of course not.

Variants of the *Ten-Percent Myth*

The myth is not simply a static, misunderstood factoid. It has several forms, and this adaptability gives it a shelf life longer than lacquered Spam. In the basic form, the myth claims that years ago a scientist discovered that we indeed did use only ten percent of our brains. Another variant is that only ten percent of the brain had been *mapped,* and this in turn became misunderstood as ten percent *used.* A third variant was described earlier by Craig Karges. This view is that the brain is somehow divided neatly into two parts: the conscious mind which is used ten to twenty percent of the time (presumably at capacity); and the subconscious mind, where the remaining eighty to ninety percent of the brain is unused. This description betrays a profound misunderstanding of brain function research.

Just as people don't use all of their muscle groups at one time, they also don't use all of their brain at once.

Part of the reason for the long life of the myth is that if one variant can be proven incorrect, the person who held the belief can simply shift the reason for his belief to another basis, while the belief itself stays intact. So, for example, if a person is shown that PET scans depict activity throughout the entire brain, he can still claim that, well, the ninety percent figure really referred to the *subconscious* mind, and therefore the Ten-Percent figure is still basically correct.

Regardless of the exact version heard, the myth is spread and repeated, by both the well-meaning and the deliberately deceptive. The belief that remains, then, is what Robert J. Samuelson termed a "psycho-fact, [a] belief that, though not supported by hard evidence, is taken as real because its constant repetition changes the way we experience life." People who don't know any better will repeat it over and over, until, like the admonition against swimming right after you eat, the claim is widely believed. ("Triumph of the Psycho-Fact," *Newsweek,* May 9, 1994.)

The origins of the myth are not at all clear. Beyerstein, of the Brain Behaviour Laboratory at Simon Fraser University in British Columbia, has traced it back to at least the early part of the century. A recent column in *New Scientist* magazine also suggested various roots, including Albert Einstein and Dale Carnegie (Brain Drain 1999). It likely has a number of sources, principally misunderstood or misinterpreted legitimate scientific findings as well as self-help gurus.

The most powerful lure of the myth is probably the idea that we might develop psychic abilities, or at least gain a leg up on the competition by improving our memory or concentration. All this is available for the asking, the ads say, if we just tapped into our most incredible of organs, the brain.

It is past time to put this myth to rest, although if it has survived at least a century so far, it will surely live on into the new millennium. Perhaps the best way to combat this chestnut is to reply to the speaker, when the myth is mentioned, "Oh? What part don't you use?"

Acknowledgments

I am indebted to Dr. Barry Beyerstein for providing research help and suggestions.

References

Beyerstein, Barry. 1999. Whence cometh the myth that we only use ten percent of our brains? In *Mind-myths: Exploring Everyday Mysteries of the Mind and Brain,* edited by Sergio Della Sala. New York: John Wiley and Sons.

Brain Drain. 1999. The Last Word (column). *New Scientist* 19/26 December 1998–2 January 1999.

Clark, Michael. 1997. *Reason to Believe.* New York: Avon Books

Geller, Uri, and Jane Struthers. 1996. *Uri Geller's Mind-power Book.* London: Virgin Books. □

Finding Awe, Reverence, and Wonder in Science

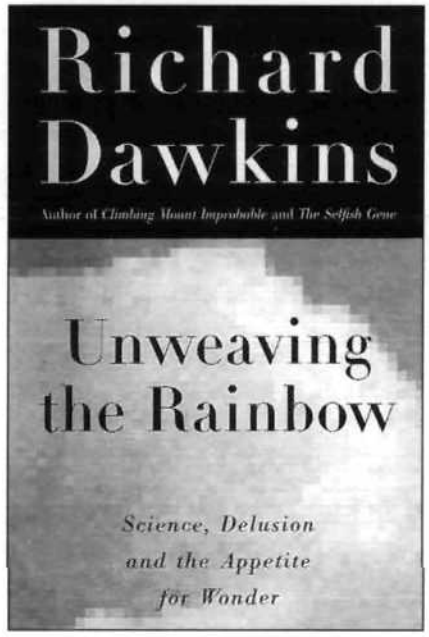
KENDRICK FRAZIER

Unweaving the Rainbow: Science, Delusion, and the Appetite for Wonder. By Richard Dawkins. Houghton Mifflin, Boston, 1998. ISBN 0-395-88382-2. 337 pp. Hardcover, $26.

The central challenge addressed in Richard Dawkins's *Unweaving the Rainbow* is the perception among many that science somehow diminishes our appreciation of the world. It is a problem all who attempt to explain science to the wider public must sometime face, and noted thinkers like Richard Feynman, Carl Sagan, and Martin Gardner all have written about it. In 1995, Dawkins, the noted Oxford zoologist and evolutionist (and CSICOP Fellow), became the first Charles Simonyi professor of the public understanding of science at Oxford. In this book he faces these wider issues, which go far beyond evolutionary biology but are still enriched and informed by Dawkins's intimate familiarity with that subject. His title is from Keats, who believed that Newton had destroyed all the poetry of the rainbow by reducing it to its prismatic colors.

Dawkins quickly lays that particular complaint to rest by showing how Newton's optics led to spectroscopy which led to measurement of emission and absorption line spectra and thereby to direct understanding of the nature and characteristics of stars—their size, luminosity, history, and future ("Barcodes of the Stars")—and then to our wider understanding of the cosmos.

"Newton's dissection of the rainbow into light of different wavelengths led onto Maxwell's theory of electromagnetism and thence to Einstein's theory of special relativity," notes Dawkins, adding: "If you think the rainbow has poetic mystery, you should try relativity." All from a little "unweaving of the rainbow." And nothing about it need diminish our astonishment and appreciation of the beauty of a rainbow arcing across the rain-darkened sky.



The positive message throughout is that the impulses to awe, reverence, and wonder that led the poet William Blake to mysticism (and lesser figures to paranormal superstition) are "precisely those that lead others of us to science. Our interpretation is different but what excites us is the same." The scientist has the same wonder, the same sense of the profound, as the mystic, but with an additional impulse: let's find out what we can about it. (SKEPTICAL INQUIRER readers got a teaser of some of the book's arguments in Dawkins's article "Science, Delusion, and the Appetite for Wonder," March/April 1998.)

Dawkins argues that while poets might well seek inspiration from science, science should reach out to wider constituencies among poets, artists, and all others who share some of the same impulses.

He doesn't argue that scientists should attempt to write poetically, unless like Sagan or Loren Eiseley they have unique skills in that area. Simple clarity will do. Says Dawkins: "The poetry is in the science."

Along the way, Dawkins examines superstition and gullibility, lamenting how people can find the "meaningless pap" of astrology appealing, in the face of the real universe as revealed by astronomy. He suggests that grouping people according to which of only 12 mythic signs they were born under is "a form of discriminatory labeling rather like the cultural stereotypes that many of us nowadays find objectionable." He regrets that we are "in the grip of a near epidemic of paranormal propaganda on television." He recalls Arthur C. Clarke's Third Law, "that any sufficiently

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advanced technology is indistinguishable from magic," and thoughtfully considers, "How are we to know when skepticism is justified, and when it is dogmatic, intolerant short-sightedness?" He refers to a "spectrum of improbabilities" and suggests ways to think about how to evaluate an amazing or miraculous story.

Abetted by the media, astrology, paranormalism, and alien visitations have an inside track on the public consciousness, Dawkins notes, but there may be paradoxical grounds for encouragement in the realization that at least some of this tendency exploits "our natural and laudable appetite for wonder." This wonder, given proper access, can be fulfilled just as well by science and the real wonders of nature.

In one chapter, "Unweaving the Uncanny," Dawkins shows how to "take the sting out of seemingly astonishing coincidence by quietly sitting down and calculating the likelihood that it would have happened anyway." He invents a term he calls PETWHAC, for Population of Events That Would Have Appeared Coincidental, useful in evaluating how probable improbable-seeming events actually are, liberating us from a need to invoke occult forces. He offers a number of fresh examples, such as when his wife bought her mother an antique watch and she got it home and peeled off the label to find revealed her mother's initials, "M.A.B." "Uncanny?" Dawkins asks. He does the calculation based on frequencies of names in phone directories and finds that if everyone in Britain bought an antique engraved watch, 3,000 of them would find their mother's initials on it.

Seeking to understand how we are so strongly impressed by coincidences, Dawkins turns to his Darwinian roots. Like all other creatures, humans must behave as intuitive statisticians. We need to steer between false positive and false negative errors according to which offer the greater penalty in a given situation. Furthermore, our willingness to be impressed by uncanny coincidence was influenced by the smaller population size of our ancestors and the relative sameness of their everyday experience, leading us to expect a very modest level of coincidence. Yet today we are immersed in a giant global media culture and our access to stories of all kind is multiplied many times compared with that of our small-village ancestors. This means, says Dawkins, that the number of opportunities for coincidence is greater for each one of us than it would have been for our ancestors, and consequently greater than our brains are calibrated to assess. Theoretically, we can learn to recalibrate ourselves, but that is "revealingly difficult even for sophisticated scientists and mathematicians."

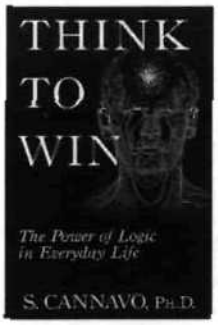
There is much else in Dawkins's purview. He writes about DNA fingerprinting (a bit hard-going, I must admit). He offers chapters on not just good poetic science, where helpful analogies and metaphors stimulate the imagination, but also on the danger of "bad poetic science," the power of poetic imagery to inspire bad science, even if it is good poetry. Included here are Teilhard de Chardin's "euphoristic prose poetry" and also the notorious fondness of mystics for "energy" and "vibrations," technical terms creating the illusion of scientific content where there is no content of any kind. Quantum uncertainty has provoked its share of bad poetic science too, as has the postmodernist movement in academia and even, surprisingly, Dawkins's own field of evolutionary theory. Dawkins considers his own concept of the "selfish gene" good poetic science that aids understanding rather than impedes it but says it is susceptible to being misunderstood by bad poetic science.

Another chapter describes how there is a sense in which our DNA is a coded description of the worlds in which our ancestors survived. "And isn't it an arresting thought?" Dawkins asks. "We are digital archives of the African Pliocene, even of Devonian seas; walking repositories of wisdom out of the old days. You could spend a lifetime reading in this ancient library and die unsated by the wonder of it." In a related sense, the brain of an individual houses a parallel set of models of the animal's own world.

The final chapters deal with the wonderful machinery of perception. One example is how the nerve cells economize by registering only *changes* from moment to moment and ignoring the more common stasis—all the boring stuff. Computers are poor at recognizing patterns such as faces, but humans, through evolution, have become superb at these and other pattern-recognition abilities. We usually create fairly accurate models of the world but can also create illusions and concoct hallucinations when something goes just slightly awry. "A brain that is good at simulating models in imagination is also, almost inevitably, in danger of self-delusion," Dawkins warns. When we see visions of angels, saints, or gods, they seem real because they *must*; they are models put together by the normal simulation software in the brain using the same modeling techniques that it ordinarily uses when presenting its continuously updated edition of reality.

The scientist has the same wonder, the same sense of the profound, as the mystic, but with an additional impulse: let's find out what we can about it.

Dawkins is one of the treasured few scientists today writing in depth about science and scientific processes for intelligent general readers whose works are simultaneously scientifically rich and provocative, accessible (although there is never a sense of being watered down), and successful. He brings a discerning critical intelligence and an impassioned concern in the hope that we will find science worthy of our own awe. At the same time by learning about our own genetic and environmental heritage and the workings of our brains we can learn how to be aware of our own capacities for self-delusion.



Logic in Everyday Life

MARK W. DURM

Think to Win: The Power of Logic in Everyday Life. By S. Cannavo. Prometheus Books, New York, 1998. ISBN 1-57392-211-0. 270 pp. Paperback, $17.95.

Cannavo has penned an informative, educational, and yet very entertaining book. There is much to think about this book of thought. Cannavo, emeritus professor of philosophy at Brooklyn College, C.U.N.Y., has an interactive method of writing that keeps the listener interested and engaged.

This book is simply about reasoning, and it is offered as "the alternative to New Age feel-good spiritualism, psychism, and post-science mysticism—especially of the 'quantum hocum' variety—all presently stacking the nation's bookshelves in diluvial quantities." Cannavo proffers three objectives: 1) create a kind of logical awareness that will serve as an enduring guide to effective thinking; 2) present reasoning as a powerful tool and subject of general interest; and 3) endear to the reader a deep satisfaction with reasoning and understanding—an aesthetic aspect, if you will. Cannavo succeeds in all three.

He wittily explains inductive and deductive logic and the difference between the two. He uses everyday situations and examples that all readers can identify with, and he does so without the use of complex, Morpheus-like tomes of formal logic.

Cannavo deftly describes the pitfalls to logic. He mentions how "hidden assumptions" between two disagreeing people can prevent either from understanding the other's point of view; how different "implicit value assumptions" between two people can cloud the view of understanding; and how "word tangles"—semantics, if you will—can prevent agreement. "Clearing semantic underbrush . . . seems necessary in any move toward agreement," he writes. "In any argument, the ways in which we understand key words amount to unstated assumptions."

Chapter 4 is an interesting discussion on the difference between the "explanation" of something and the "moral justification" of that same thing. For instance, one may not be able to morally justify the killing of someone ("Thou shalt not kill") but could explain it during time of war. Chapter 5 deals with nonsense—the "viruses in our knowledge," as Cannavo adroitly describes it. He asks, "When were you last either bemused or a-mused by an inconsistent statement?" He describes how these inconsistencies can confuse and contradict and yet in some cases may make some sense, such as the oxymoron "He killed me with kindness," or "She was eloquent with her silence." In a later chapter, the author lists nine "right questions" useful in responding to the claims and arguments that confront us daily. The chapter is entitled "Asking The Right Questions: A Mini-Manual for the Critical Thinker" and should be required reading for everyone.

"Fallacies: Seduction and Deception" is how Cannavo titles one section of his book, spending five chapters explaining these mistakes in reasoning. He describes in everyday terms *red herring* (a smoker exclaiming, "Well, I got to die from something."); appeal to authority (a student saying, "It must be so, because my professor said it was so"); *personal abuse* (a U.S. senator calling feminists "a band of bra-less bubbleheads"); and many more examples. Also, Cannavo explains *double talk* and the confusion that results from it. There are two types of double talk, equivocation and amphiboly. An example of equivocation would be a person stating that since the Bill of Rights gives him certain *rights*, he must be *right* in his assumptions. Amphiboly arises from loose, grammatical structure, for example a roadhouse sign that reads: "Clean and Decent Dancing Every Night Except Sunday!"

The final section is titled "Ideas: Concept Surgery." Here Cannovo describes analytical thinking and how best to analyze a concept. "In dissecting a concept," he writes, "we are dealing with the vagaries of a growing natural language and the corresponding conceptual frameworks that are changing and growing with that language. . . . The meanings . . . must be inferred inductively on the basis of what we can make out about current usage." To discuss a concept presently, one must know what that concept means in the present day.

The other side of the conceptual coin is synthetical thinking, which Cannavo discusses in one of his final chapters. The creation of new concepts and ideas is discussed, and he suggests that "pure relevation" (a sudden idea or breakthrough) is not necessarily instantaneous. Instead, he posits that "pure relevation" occurs to the sophisticated insider with the requisite knowledge. *To Cannavo, to be creative means to be rational and logical.*

At the end of the book, Cannavo gives his readers an intimate and heartfelt goodbye. In one of the last sentences he writes ". . . I would judge the success of this book not so much by how many copies are sold but by the measure of this difference—your closer intimacy with the simplicity, beauty, and wondrous power of how we reason." The first sentence of the book promises "self-enlightenment." Cannavo delivers on his promise!

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Cancer, Courage, and Clear Thinking

ROBERT LOPRESTI

C: Because Cowards Get Cancer Too. By John Diamond. Vermillion, London, 1998. £9.99.

For half a decade John Diamond has written a weekly column for the *Times* of London. In it he has dealt humorously with all the impedimentia of city life: babies and dinner parties and lawn care.

All that changed in March 1997 when he announced that he had been diagnosed with throat cancer. Suddenly his column turned into a weekly report on a life-and-death struggle. It was sometimes hilarious, sometimes horrifying, but always full of wit, honesty, and good writing.

C is not a collection of his columns, although some of them appear in its pages. Rather it is, as he says, the book he went looking for on the night of his diagnosis: a patient's view on what the experience is like.

What might particularly interest readers of SKEPTICAL INQUIRER are Diamond's encounters with advocates and practitioners of alternative medicine—the type of person he categorizes as: "a homeopath, reflexologist, iridologist, or otherwise a scatterer of pixie dust among the deserving middle classes."

As soon as he announced his illness he started to hear from these people. To his credit he had no interest in grasping at their mystical straws. In one argument he asked a know-it-all, "Why it is that all the best medical systems from the mystic East and deepest Africa come from countries where the average lifespan is that of a World War I pilot with a death wish?"

Diamond points out that many of the alternative approaches brag that they haven't changed in hundreds of years. Oddly enough, he notes, the percentage of patients cured of cancer didn't change during that time either. But then, "Enter nasty orthodox medicine, selfserving, arrogant, ignorant of lines of energy and pressure points, focused on the symptom rather than the whole person, and what do you know? Suddenly people start recovering from cancer."

Diamond was pronounced cured in the fall of 1998 but he will live all his life with the side effects of the radiotherapy and surgery that treated him. His diet is mostly liquid and he is in speech therapy because his voice became a "honking impression of Charles Laughton. . ." He also won the Columnist of the Year Award for his efforts.

Diamond has taken on another column; this one in the *Sunday Telegraph.* He says it is a first in British journalism: "My job each week is to rubbish one or another aspect of alternative medicine."

As the subtitle makes clear, John Diamond rejects the label "brave," which is frequently thrown at him. Bravery, he says, implies a choice. But writing this story, with its revelations of cowardice, bad temper, and misery, took a kind of courage for which we can all be grateful. □

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NEW BOOKS

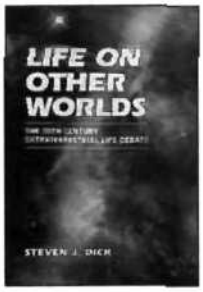
Listing does not preclude future review.

***Alexander Fox and the Amazing Mind Reader.* John C. Clayton.** Prometheus Books, 59 John Glenn Dr., Amherst, NY 14228-2197. 1998. ISBN 1-57392-221-8. 78 pp. Softcover. $12.95. At the request of a classmate, sixth grader and scientific investigator Alex Fox probes the mystery of a so-called psychic who claims to read minds and find missing objects. Illustrated mystery and detective story for young readers eight and up. Intended to show that critically investigating claims can be fun and that independent thinking, open-mindedness, skeptical inquiry, and critical awareness are cool too.

***Enchanted Looms: Conscious Networks in Brains and Computers.* Rodney Cotterill.** Cambridge University Press, 40 W. 20th Street, New York, NY 10011-4211. 1998. ISBN 0-521-62435-5. 508 pp. Hardcover. $24.95. Noted biophysicist Cotterill (Danish Technical University) strives in this major work to bridge the gap between the bottom-up approach to understanding consciousness, anchored in the brain's biochemistry, anatomy, and physiology, and the top-down strategy that concerns itself with behavior and the nervous system's interactions with the environment. He seeks to make what he believes to be necessary distinctions between the different areas of activity that could claim a place under the brain's neural network functioning banner.

***The Golem at Large: What You Should Know About Technology.* Harry Collins and Trevor Pinch.** Cambridge University Press, 40 W. 20th Street, New York, NY 10011-4211. 1998. ISBN 0-521-55141-2. 163 pp. Hardcover. $19.95. Following up on their earlier volume *The Golem: What You Should Know About Science,* sociologists of science Collins and Pinch provide a series of case studies to demonstrate their view that the imperfections in technology are related to the uncertainties and fallibilities in science described in the first volume. The case studies cover the Patriot antimissile missile, the Challenger Space Shuttle explosion, tests of nuclear fuel flasks and of anti-misting kerosene as a fuel for appliances, economic modeling, the question of the origins of oil, analysis of the Chernobyl nuclear disaster, and the contribution of lay expertise to the analysis of treatments for AIDS.

***Life on Other Worlds: The 20th Century Extraterrestrial Life Debate.* Steven J.**



Dick. Cambridge University Press, 40 W. 20th Street, New York, NY 10011-4211. 1998. ISBN 0-521-62012-0. 290 pp. Hardcover. $24.95. Astronomer and historian of science Steven Dick (U.S. Naval Observatory) provides a readable history of the twentieth century extraterrestrial life debate, one of the pervasive themes of the century. The book places the debate in historical perspective and connects its importance to understanding science, religion, philosophy, and other human endeavors. Includes good chapters on extraterrestrials in literature and the arts and on "The UFO Controversy and the Extraterrestrial Hypothesis" as well as the scientific search for extraterrestrial intelligence.

Once Upon a Number: The Hidden Mathematical Logic of Stories. **John Allen Paulos.** Basic Books, 10 E. 53rd Street, New York, NY 10022-5299. 1998. ISBN 0-465-05158-8. 214 pp. Hardcover. $23. Mathematician and CSICOP Fellow John Paulos (Temple University) follows up on his popular books *Innumeracy, Beyond Innumeracy,* and *A Mathematician Reads the Newspaper* by showing that numbers (usually considered abstract, certain, eternal, dry, and bloodless) and stories (full of life, engaging of the emotions, subjective) have a lot more in common than you might think. The concepts of logic and probability, for example, both grew out of intuitive ideas about how certain stories would play out. Paulos explores a variety of topics including a defense lawyer's mathematically innumerate distortion in the O.J. Simpson trial, the relationship between intuitive understanding and formal mathematics, and Occam and two-bit stories.

Turning Off the Heat. **Thomas R. Casten.** Prometheus Books, 59 John Glenn Dr., Amherst, NY 14228-2197. 1998. ISBN 1-57392-269-2. 269 pp. Hardcover. $26.95. An energy expert and cogeneration company president (Trigen Inc.), Casten shows how global warming can be addressed without hurting the economy by finding ways to improve efficiencies. Two-thirds of the fuel burned around the world to generate electricity is wasted. Casten shows how by unleashing market forces and eliminating barriers to inefficiency carbon dioxide emissions can be cut in half while consumers still save money. With a foreward by recent Secretary of Energy Federico Peña.

Editor's Choice Science Book:

Leonardo's Mountain of Clams and the Diet of Worms: Essays on Natural History. **Stephen Jay Gould.** Harmony Books, 201 East 50th Street, New York, NY 10022. 1998. ISBN 0-609-60141-5. 422 pp. Hardcover. $25.

—*Kendrick Frazier*

ARTICLES OF NOTE

Angell, Marcia. "Trial by Science." *The New York Times,* December 9, 1998. Op-Ed column about the conclusion of a panel of four scientists appointed by a federal judge in the breast implant litigation that scientific evidence so far has failed to link breast implants with immune disorders. In the wake of other cases that became "a hotbed of junk science," Angell, executive editor of the *New England Journal of Medicine,* praises Judge Sam C. Pointer Jr.'s appointment of a dispassionate panel of experts to evaluate the strength of the scientific evidence as "a model more courts should follow."

Bower, Bruce. "Dr. Freud Goes to Washington." *Science News,* November 28, 1998, pp. 347–349. Good, balanced report about the controversy over the legacy of Sigmund Freud, occasioned by opening of a new exhibit at the Library of Congress. "Modern psychoanalysts, a diverse lot of therapists who form several warring camps, view the exhibit as a ratification both of major themes in Freud's work and of the clinical usefulness of psychoanalysis and related talk therapies. The current group of detractors includes experimental psychologists whose field also features abundant intellectual strife. They see the new Library of Congress exhibit as an opportunity to stage a public dethroning, if not impeachment, of the imperial Freud . . . [T]he critics hope to raze what they consider to be a rotting psychoanalytic palace built on a swamp of repression and dream interpretation."

Churchill, Martha A. "TV Slant on Implosion Plays to Hysteria." *The Detroit News,* November 3, 1998. Attorney lambastes fear-producing TV news reports following implosion of a building in Detroit. Two local newscasts produced breathless accounts of toxic dust being spread in the implosion's sinister-looking cloud of dust. "Perfectly normal people can be infected by hysteria, if the authority figure is prominent enough and if the fear hits a public nerve." The news reports pushed all the right buttons, Churchill says.

Cracchiolo, Camilla. "Pharmacology of St. John's Wort: Botanical and Chemical Aspects." *The Scientific Review of Alternative Medicine,* 2(1):29–35, Spring/Summer 1998. Fairly technical article on the pharmacology of St. John's Wort, which a 1996 study showed appears to be effective in the treatment of mild to moderate depression. This article doesn't deal with its effectiveness, but finds that there are major problems with product standardization (including 17-fold variations in hypericin levels in several of the most popular brands) and calls for adoption of manufacturing and labeling regulations for all herbal products.

Fraknoi, Andrew. "Ask Astro: Astronomy Vs. Astrology." *Astronomy,* January 1999, pp. 102–103. Q&A feature responds to question, "What is the difference between astrology and astronomy?" Astronomer Fraknoi provides a good discussion.

Hansson, Sven Ove. "A Case Study of Pseudo-Science in Occupational Medicine." *New Solutions,* 8(2):175–189, 1998. In 1987 Herbert E. Stokinger published a paper purporting to show that eight specified chemical carcinogens have thresholds. This detailed analysis finds that for seven of the eight instances, the sources do not support his conclusions and in some of these cases they even support the opposite conclusion. Hansson says Stokinger's paper satisfies classical criteria of pseudoscience.

Kolenda, Nancy. "From the Editor's Desk." *Frontier Perspectives,* 7(2):3, Fall 1998. A response by the executive editor of *Frontier Perspectives,* published by the Center for Frontier Sciences at Temple University, to Martin Gardner's critical column in SKEPTICAL INQUIRER, "What's Going On At Temple University?" (September/October 1998). She says Gardner's "negative

appraisal" contained "many reckless allegations." Kolenda says "we have great respect for the Committee for the Scientific Investigation of Claims of the Paranormal," and "we hope to make Gardner's article the beginning of a fruitful dialogue between skeptics and frontier scientists." She says "it has always been our view that skepticism is a part and parcel of frontier science." Other responses by Kolenda and three others associated with her publication, and Gardner's replies, plus comments by others, appear in letters to the editor in SI, January/February 1999, and this issue. Kolenda says she intends to publish the entire debate in *Frontier Perspectives.*

Streitberger, K., and J. Kleinhenz. "Introducing a Placebo Needle into Acupuncture Research." *The Lancet,* 352:364–365, August 1, 1998. The authors developed a placebo needle, with which it should be possible to simulate an acupuncture procedure without penetrating the skin. The purpose is to overcome a problem in acupuncture research of having a control group. With the placebo needle, none of the volunteers suspected that the needles may not have penetrated the skin, showing that the placebo needle is sufficiently credible to be used in investigations of the effects of acupuncture.

Toumey, Christopher P. "In Search of Noah's Ark." *Catholic Digest,* November 1998, pp. 98–105. Good, short article that surveys and dismisses false evidence of Noah's Ark. Good illustrations and maps accompany it. Condensed from *Natural History,* November 1997.

Wiseman, Richard, Matthew Smith, and Julie Milton. "Can Animals Detect When Their Owners Are Returning Home? An Experimental Test of the 'Psychic Pet' Phenomenon." *British Journal of Psychology,* 89:453–462, 1998. In his book *Seven Experiments That Could Change the World,* Rupert Sheldrake suggested that the public carry out experiments to test whether pets can psychically detect when their owners are returning home. An Australian television company performed the first of these tests, with a dog named Jaytee, which appeared remarkably successful and seemed to show Jaytee responding when her owner set off to return home from a remote location. Sheldrake and the dog's owner asked Wiseman et al. if they would like to carry out their own investigation. This paper first outlines possible various "normal" explanations, then details the procedure and results of four experiments. In all four experiments, the dog failed to detect accurately when the owner was setting out for home. The authors discuss possible reasons for the difference in results of these studies and those carried out by the Australian television company.

—Kendrick Frazier

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James Austin; MIT Press

4 ***The Ecology of Eden***
Evan Eisenburg; Knopf

5 ***Calculus for the Utterly Confused***
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6 ***The Symbolic Species***
Terrence Deacon; W.W. Norton

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Straight Flush

Evolution, Complexity, and Progress

RALPH ESTLING

Stephen Jay Gould has long and consistently maintained that it is a "false and self-serving notion that evolution displays a central and general thrust towards increasing complexity, when life, in fact, has been dominated by its persistent bacterial mode for all 3.5 billion years of its history on Earth" ("Cope's Rule as Psychological Artifact," *Nature,* 16 January 1997).

It is, I think, not possible to look at the paleontological record and not see a more or less regular increase in complexity.

The operative word here is, I think, *dominated.* If Gould is arguing that *dominated* means that bacteria have been around for 3.5 billion years before man and are likely to be around for at least that long after him or that they are far more ubiquitous or that the total biomass as well as number of Earth's bacteria is vastly in excess of that of humans, I can find nothing to cavil about.

But of course Gould's assumption and advocacy go far beyond. He means that bacteria ruled Earth from the start, rule it now, and shall go on ruling it until the sun becomes a red giant, however we define the term *rule.* (Gould's actual phrase is "until the sun explodes." In fact, the sun isn't massive enough to explode, but it will expand and, so far as Earth is concerned, it will not make all that much difference to our star going supernova.)

I do not know what meaning *evolution through natural selection* has if it does not include in that meaning a gradual (perhaps also a punctuated) development in complexity, on the large, big-picture scale of view. It is, I think, not possible to look at the paleontological record over the long term and not see a more or less regular increase in complexity among living things. I do not know what else evolution is, for it certainly is not mere change. It is clearly, self-evidently, much more.

Something else Gould doesn't believe in is progress by evolutionary development. Again our point of view depends on what we take the word—in this case that troublesome term *progress*—to mean in the context we are dealing with.

One thing we should not do is equate mere increasing complexity with progress, whether in biology, architecture, women's fashions, or anything else. The best definition of evolutionary progress by means of natural selection that I can think of is a growth in the overall complexity of organisms that allows them to exercise increasing control over their environment. Some of us call this *progress.* If this is not progress then I do not know what the word means.

A third word Gould defines in a way I find galling is *chance.* In *Wonderful Life, Full House,* and elsewhere, Gould reminds us that if we turn the clock back four billion years and start the evolutionary ball rolling again on Earth, the results will be very different. They will be different each time we run the game of evolution through. This is because natural selection will be working on different life forms, different because conditions and contingencies will be different each time, and over time these differences will accumulate and accelerate, like compound interest. But Gould does not add that *this* is because natural selection will be working precisely and punctiliously the same as it always works, as it must work, for natural selection must obey its own rules and can never alter or ignore the rules, for then it would cease being *natural* or *selective.* Chance and contingency will throw up different life forms each time we play the game, because conditions are never exactly the same twice. But whatever it works on, natural selection will work on them by the same old rules because the rules never change and the first rule is: improvements remain.

Each step in the game of evolution through natural selection is not a matter of going back to start. There is incremental advance—there is, dare I say it,

Ralph Estling writes from Ilminster, Somerset, U.K.

progress—going on, bit by bit. This advance, this progress, this increase in complexity and in *control* is not invariable; there are long periods during which nothing much happens and there are many instances when things seem to be backing up, but, looked at overall, life develops. It has been developing these last 3.5 billion years and it will go on developing for as long as conditions permit. This is the essence of evolution. Some things, like bacteria, have stayed comparatively simple through their entire history. Other things have not. Some, such as parasites and that ultimate of all parasites, viruses, have retrogressed. But, by and large, most life forms have, if only in a slipshod, haphazard way (which seems to be nature's manner of doing things), grown more complex and more in control of their environments.

Of course, the more complex a life form gets, the more dangerous the game becomes, because complexity means that the life form is more vulnerable to change, to contingency, to being hit on the head by a large asteroid. This is why bacteria have managed and will continue to manage much better than any other more complex, more "progressive" life forms, as far as continuity and survival down the eons go. The less complicated you are, the safer. But—and this is the point—nature has never operated on the basis of safety first. It seems to enjoy (if I can for a moment commit the sin of personification) playing the game of Life Poker for high stakes, and the greater the risk the more fun it seems to get. The game is at its riskiest now, with the recent emergence of a highly complex life form possessing a rudimentary intelligence that is capable of destroying itself and, just possibly, all other complex life forms on this planet. Its brain is an extremely complicated organ and, as one might expect, the creature appears top-heavy with it and finds great difficulty in coping with it, or even understanding how it works.

Let us pursue Gould a bit further and farther out.

Consider life forms on other planets or their moons. The same criteria must apply as apply here. Whatever the particular qualities and characteristics of the life forms, the rule will be that those that fit best into their environment will be the ones that stick around—until something happens to the environment, at which point all that wonderful adaptation will become a noose around their collective neck. This is why we have extinctions, as well as development, in the course of natural selection. It's not a case of our knowing what particulars of evolutionary form these extraterrestrial organisms will take, just as there is no way of knowing what will result right here on Earth if we play the game again from scratch, but we know that natural selection will be operating. The natural laws, rules, and universals in time and place will function, whenever and wherever these matters arise in the universe.

If we contend that we do not know anything about the particular life forms on Planet X or Moon Y, we can surmise nothing about them, we are almost certainly wrong, for we can surmise that evolution by means of Darwinian natural selection is operating on them. And even if, as with the one example we have, we know the life forms and their history (more or less), and we still are unable to make much in the way of predictions about what these forms will be like in a million years, it is no great matter. We know that in a million years and in a billion years the life forms will still be answerable to natural selection, even if one of those life forms becomes so advanced it is able to substitute its own selectivity and create faster racing horses, sillier looking dogs, new species of bacteria, and even new species of itself. Even if it creates life out of silicon, rather than the same old carbon, or clones the old into the new, the same rules of the game will apply, because artificial selection, no matter how clever, or how stupid, cannot alter those rules, it can only use them this way or that.

We could, if we were stupid enough, set out to eliminate those forms that are best adapted and see to it that creatures *out* of tune with their surroundings were the only ones to survive (we have gone a long way down this path with our domestication of plants and animals, where the most naturally *un*fit survive), but this would necessitate a constant, never-ending intrusion of artificial selection by us into the natural rhythm. The moment this interference ended, all the old patterns of natural selectivity would reassert themselves with a vengeance, because we could never succeed in destroying the rules but only in keeping them dormant and hiding, ready to pounce back the first chance they got, and turn our foolishness and arrogance into bloody fruition.

We know that in a million years and in a billion years the life forms will still be answerable to natural selection.

Natural selection will always determine what to do with the results that chance and contingency throw its way. Order is the key to the game. Of course there is chance, randomness, there are accidents. But there is unalterable law beneath and beyond them.

Gould's conclusion, that things will work out differently with each evolutionary throw of the dice, is obvious, and therefore uninteresting and lacking in real significance.

Nothing is written. Nothing is preordained. We *know* that, should evolution begin all over again, the outcomes along the way could not be the same. That is not the question we need ask, and seek answers to. The question is: How different would it be? How different *could* it be? What are the *limits* of the possible divergences? Of *course* there is chance. How could there not be? But there is also necessity. It is the interplay between them that beguiles us. It is *this* we need to know.

Lewis Thomas describes in *The Fragile Species* his utter amazement that life on Earth has moved, in a mere 3.7 billion years, from archaebacteria to the Mass in B-Minor.

If that is not development, growth in complexity, advance, progress, then what is? □

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The Mead-Freeman Controversy

James Côté is right to argue "that it is Freeman who has hoodwinked the public, not some Samoan women or Margaret Mead" (November-December, 1998 p. 33). However, Côté is wrong to assert that Freeman has a significant Australian following or that his media profile is high. Derek Freeman is no more well-known in Sydney or Melbourne than he is in New York or London. Most of the scholarly and nonscholarly articles on the Mead-Freeman debate are American, not Australian. Only one of six science reporters at the four major Sydney newspapers has ever heard of Freeman. David Williamson's play "Heretic" was a critical and commercial failure in Australia, died quickly, and has been produced nowhere else. Of those few who saw the play, there's no evidence that anyone believed its message. Sales of Freeman's new book are meager. It was seldom reviewed in the Australian press. . . . The letter that my University of Sydney colleague Bob Young and I received from Freeman following our article in the *Australian & New Zealand Journal of Sociology* was a raving and incoherent tirade with four-letter words. It is "much ado about nothing." Mead's reputation is secure. Sadly, so is Freeman's. Derek, put aside the Mead obsession and get a real life while you still can.

Stephen Juan, Ph.D.
Faculty of Education
University of Sydney
N.S.W. 2006
Australia

In "The Mead-Freeman Controversy: A Fresh Look" neither the article by James E. Côté nor the one by Paul Shankman mentions the book *Quest for the Real Samoa—The Mead/Freeman Controversy and Beyond*, by Lowell D. Holmes (Bergin and Garvey Publishers, Inc., 1987). Am I missing something? It seems to have made many of the same points with similar conclusions eleven years earlier.

Richard D. Geckler
LaJolla, Calif.

I am deeply indebted to Paul Shankman who, in his article "Margaret Mead, Derek Freeman, and the Issue of Evolution," has given me the words for which I have been searching for a very long time now.

While his words were directed to the controversy created by the Freeman attacks on Mead, they also apply to the controversy created by the attacks of the False Memory Syndrome Foundation (FMSF) on the psychotherapeutic profession and community. To paraphrase Dr. Shankman's sentence preceding his most appropriate language, The critique of psychotherapy and the practice of the discipline that has turned off the psychologists, social workers, and psychiatrists has attracted the media. Intelligent people, including Martin Gardner, have been drawn to the FMSF appeals to expose an epidemic of malpractice and client abuse.

The words for which I am thankful, and which express my sense of the problem with what passes for "discussion" of the false memory, repressed memory, recovered memory "controversy" are, as Shankman writes, "The truth about the controversy is more mundane." If only this would be taken to heart, most of the heat and almost all of the misleading rhetoric could be removed from discussions of the real issues and problems involved.

Kenneth L. Salzman, Ph.D.
Licensed Psychologist
ksalzman@usa.net

The authors of the two articles in defense of Margaret Mead did an excellent job of vilifying Derek Freeman and a mediocre job of defending Mead's writings about life in Samoa. I noted, however, that, although they delved into many aspects of Mead's philosophy (evolution, interactionism, etc.) they were very careful to avoid any mention of her main influence in America as a Communist fellow-traveler and an educational philosopher.

Mead was obviously strongly influenced by Rousseau and A. S. Neill's Summerhill school modeled after Rousseau's educational ideas, and of course, John Dewey.

Mead contributed enormously to the belief that the teacher and the child's parents are natural enemies. Writing in *Progressive Education* nearly sixty years ago, she identified American schoolchildren as victims facing a "moral dilemma" when entering school: "During his first months in school and increasingly throughout his school experience, he comes to realize that his parents' way of doing things is regarded by his schoolmates as foreign, odd, low-grade, queer, faddish, old-fashioned, newfangled." (Reprinted from *Progressive Education*, 1941, in *Education* April–May, 1974, p. 370). . . .

The success of the efforts of social scientists such as Margaret Mead is fairly evident today. Most American youths take their values mainly from their peers, with the educational institution acting as an encouraging facilitator. Note that Mead urged teachers to help students behave according to their own standards, as though students had a full set of standards already operational. Mead and others like her never seriously questioned the origins of these children's self-invented standards of conscience except to declare them virtuous, and to say that if the parents had anything to do with their development and acquisition they were suspect and warranted rejection. . . .

James Lee
Professor Emeritus
Ohio University
Athens, Ohio

This letter concerns your unanimous defense of Margaret Mead in the SKEPTICAL INQUIRER.

She was a pupil of Franz Boas, who was a cultural determinist. Mead, and a number of his other pupils, were strangely placed in the anthropological departments of major U.S. universities. They taught a form of "social" anthropology rather than the then-dominant "physical" anthropology. This was apparently promoted by the powers that be.

The primary goal was to establish environment rather than biology as the controlling factor in differing racial accomplishment. Today it is the politically correct position.

However, I am skeptical of politically motivated "scientific" theories. With the recent advances in genetics, I am convinced that Derek Freeman will be proved correct by scientists of future generations.

James Gardner Erickson
Hot Springs, Mont.

On page 35 of your November/December 1998 issue is the statement, "One of the most interesting aspects of Freeman's critique [of Margaret Mead] is that a number of intelligent people have actually come to believe it [the alleged hoax of Samoan sexual practices]."

How can that be? Could it have anything to do with the article five years ago in the SKEPTICAL INQUIRER, Winter 1993 (Volume 17, No. 2), page 131, where it says, ". . . new and irrefutable evidence has come to light that young Mead was indeed the gullible victim of a playful hoax."

So which is it? Many people have come to rely on the SKEPTICAL INQUIRER as a reli-

able source of information. Is it any surprise that "a number of intelligent people" believed what they read in SKEPTICAL INQUIRER five years ago?

Jud McCranie
jud.mccranie@mindspring.com

Regarding Jud McCranie's letter, we thought readers would want to know that there was another side to this controversy that had not been widely aired. Derek Freeman has requested space to respond to the Côté and Shankman articles. We expect to have that response in the next issue.

—The Editor

Fossil Gaps

In "Gaps in the Fossil Record: A Case Study" (November/December 1998), David A. Thomas provides an answer to creationist objections that the fossil record lacks transitionals. Being able to explain why there are gaps in the fossil record is well and good, but we have been hearing about gaps for so long that many evolutionists are not aware that we do have transitional fossils at all levels of classification including gradual species-to-species transitions.

Species-to-species transitions are especially plentiful in the Cenozoic era, particularly in the Pleistocene epoch. I would refer interested readers to the "Transitional Vertebrate Fossils FAQ" on the Talk.Origins Archive (www.talkorgins.org) for an excellent listing of transitionals with brief descriptions. According to this FAQ "of the 111 modern mammal species that appeared in Europe during the Pleistocene, at least 25 can be linked to earlier European ancestors by species-to-species transitional morphologies."

If I were debating a creationist I would not want to miss the opportunity to debunk the "no transitionals" argument in a direct manner.

William Brown
Philadelphia, Pa.

The David A. Thomas article about gaps in the fossil record reminded me of a waggish proposal by Professor Robert Dietz of Arizona State University for "Gish's Law." The proposed law is named for creationist Duane Gish and is cited in the book *Science and Earth History* by Arthur N. Strahler (Prometheus Books, Buffalo, N.Y.).

Dietz pointed out that given related fossils A and D with a gap between them we have one gap. If intermediate fossil B is found we now have two gaps, AB and BD. An additional find of fossil C leads to three gaps, AB, BC and CD. The implications of this reasoning lead immediately to Dietz' formulation of Gish's Law: "As the fossil record becomes more complete the number of gaps continually increases."

David J. Simmons
Ridgecrest, Calif.

Science and the Unknowable

Thanks for Martin Gardner's article, "Science and the Unknowable" (November/December 1998). I discovered from it that I have been a follower of Herbert Spencer for thirty years without ever having read his works. As a retired minister in the United Church of Christ, I concluded long ago with Spencer that "the emotion behind all religion . . . is one of awe toward the impenetrable mysteries of the universe" (p. 22). Whether or not the mystery is in any sense personal is a matter of choice. I am not sure even about that, but I believe love of God (life) and neighbor is the best way to cope with existence. The rest of religion is mythology, designed to express and deal with the unknowable. It is when religion interprets its mythology in Enlightenment terms, treating it as fact rather than meaning, that it gets into trouble. Thanks also for providing truthful alternatives to the pseudoscience and paranormal claims with which we are constantly bombarded.

Rev. Gene Birmingham
Bensenville, Ill.

I read with interest Martin Gardner's article "Science and the Unknowable." In my book *The Loom of God* I build upon Gardner's insightful comments. An ape cannot ask questions about quantum mechanics because an ape's forebrain does not permit it to ask such questions. We can ask many more questions than an ape, but our brains, limited by the same kinds of biological constraints as the apes', will reach the edge of their ability to comprehend. There are questions we can never ask about our universe.

However, all is not lost. Do not be depressed. We are fortunate that computers will be both our companions and prosthetics, permitting us to further explore our mysterious universe in ways we can hardly imagine. Computers will allow us to extend our minds far beyond the limits of our own intuition.

I am encouraged and awed by theoretical physicist Freeman J. Dyson who once wrote:

> Goedel proved that the world of pure mathematics is inexhaustible; no finite set of axioms and rules of inference can ever encompass the whole of mathematics; given any finite set of axioms, we can find meaningful mathematical questions which the axioms leave unanswered. I hope that an analogous situation exists in the physical world. If my view of the future is correct, it means that the world of physics and astronomy is also inexhaustible; no matter how far we go into the future, there will always be new things happening, new information coming in, new worlds to explore, a constantly expanding domain of life, consciousness, and memory.

Clifford A. Pickover
Yorktown Heights, N.Y.

Martin Gardner's article "Science and the Unknowable" presented many good reasons for expecting that physicists will in fact always find still more fundamental phenomena to explain. But he failed to show that it is in principle impossible to explain everything. This follows from the essential nature of explanation why something is the case. At every stage such explanation is and has to be in terms of something else which, at least at that stage, is and has to be accepted as a brute fact: that is just how it is.

Once we recognize that this is the logically necessary truth about explanation we have to reconsider Gardner's claim that "There is no escape from the superultimate questions: Why is there something rather than nothing, and why is the something structured the way it is." For any answer to these superultimate questions—such as that the universe was produced by a God, and that it is the way it is because that is the way that that God wants it to be—must raise super-superultimate questions as to why that God exists and produced the universe.

It was his recognition of these truths which led Strato of Lampsacus to propound what Pierre Bayle and later David Hume called Stratonician atheism, the naturalistic doctrine that the in principle inexplicable

ultimates in the explanation of natural phenomena must be the existence of the universe and whatever are found to be its most fundamental laws. (Strato was the next but one after Aristotle to become director of the Lyceum, the research and teaching institute founded by Aristotle with funds provided by his sometime pupil Alexander the Great.)

Antony Flew
Reading, England

Examining Overconfidence

I am fairly sure (although not overconfident) that John Ruscio is right, in his article on the perils of "post-hockery" (November/December 1998), in saying that people tend to hold their beliefs more firmly than they should. But I don't think the little ten-question test of "ninety percent confidence estimates" proves the point. For a genuine test, he would have to translate "ninety percent confident," a mere phrase of the kind used loosely by most people, into something concrete, so that something substantial is at risk. For example, "Would you stake nine dollars to win one dollar on this estimate?" Or, much better, "900 dollars to win one hundred dollars?" But even that is probably not enough. For a true response, you would have to remove these hypotheticals and ask people to risk their own money. If you did, I'll bet (without giving the confidence interval) you would find that real overconfidence and rhetorical overconfidence are not at all the same.

There is an interesting parallel in psychological research. When people are presented with trivial hypothetical situations in psychological experiments, depressed people seem more realistic than people in a normal mood, who tend to be overoptimistic and excessively confident about their control of situations that are actually governed by chance. But the closer the experiment approaches a real-life situation, the more accurate the people who are not depressed seem, and the more unrealistic pessimism is shown by the depressed patients.

James B. Bakalar
Associate Editor
The Harvard Mental Health Letter
Boston, Mass.

The article on "post-hockery" by John Ruscio provided an interesting perspective, though from what I have observed "skeptics" are just as likely to fall into several of the traps he mentions as the most New-Agey among us.

However, the Plous test, in which the subject provides 90% confidence intervals to estimate 10 numerical quantities (such as the year Mozart was born) is of doubtful significance when applied to one test taker. Ruscio says that answering all ten correctly indicates "underconfidence," while answering eight or fewer indicates "overconfidence." Only by estimating nine, and precisely nine, quantities correctly does the subject show that he or she is "properly calibrated," claims Ruscio.

The most elementary probability analysis shows that Ruscio is . . . ahem . . . overconfident. Suppose that our subject is really good and provides absolutely precise 90% confidence intervals. This means that for each of the ten estimates, he has an 0.9 probability of getting it correct, i.e., of the actual value falling within the interval. What is the probability of his being "underconfident" by Ruscio's definition? Simply $(0.9)^{10}=0.349$ or about 35%. So, if a large number of *truly* "properly calibrated" subjects take this test, more than one out of three of them will be deemed "underconfident."

More generally, this is a simple binomial probability distribution, and the probability that a subject gets n correct answers is:

10	34.9%
9	38.7%
8	19.4%
7	5.7%
6	1.1%

. . . with the rest being under 0.15%. In other words, fewer than four out of ten *truly* properly calibrated subjects will be classified "properly calibrated," with about one third being classified as "underconfident" and about one fourth "overconfident."

Clearly the Plous test, as described by Ruscio, is useless as a measure of an individual's ability to give correct 90% confidence intervals, i.e., how well he knows his own knowledge, so to speak. . . .

On a more philosophical note, the very task demanded by the test is in a sense "unfair," and it's not clear how it correlates with how well justified one's confidence is on other issues (telepathy, conspiracies, the chance of the Red Sox having a winning season). Judging 90% confidence intervals is just not something we are called on to do in normal life, even though it (or a 95% interval) is a standard among statisticians. Even professionals (such as those in risk management) have a hard time with this, and call on complicated analyses. The judgments people make every day, and for which we are evolutionarily well suited, would seem to be either less demanding ("I think the theater is that way") or more so (under normal circumstances, would you want to drive at a speed for which you're only 90% sure you won't get killed on a given trip? A predator will not, unless desperate, attack prey unless it is far more than 90% certain it will survive). We tend to seek either vague (though possibly complex) information to decide between a limited number of courses of action one of which must be taken (or for which the outcome isn't all that important), or to seek a high (much higher than 90%) degree of certainty where the consequences are serious. . . .

Gordon Gullahorn
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Somerville, Mass.

John Ruscio responds:

I would like to thank James Bakalar and Gordon Gullahorn for taking the time to comment on my article. Their concerns focus on a quiz used to demonstrate overconfidence. I believe that Gullahorn overstates his point when he proclaims the quiz useless as a measure of our ability to construct 90% confidence intervals. Based on his own calculations, one can readily see that scoring 6 or fewer correct out of 10 rules out proper calibration at the 95% level of reliability typically used in statistical testing. Although space limitations prohibit a more rigorous treatment of the implications of scores on the quiz, in my experience scores rarely exceed 6 and this test therefore indicates overconfidence remarkably well, especially given its brevity.

More conceptually, Bakalar and Gullahorn each argue that the quiz needs to be more realistic, reflecting both the types of judgments that we are called upon to make in everyday life and the importance of the outcomes of our judgments. Research on overconfidence phenomena has addressed these critical issues in a number of ways. For example, tests of general knowledge that allow one to specify confidence in each answer also reveal a marked degree of overconfidence, as do examinations of physicians' and clinicians' confidence in actual diagnoses. Overconfidence has proven resistant to many other procedural modifications, including asking for more extreme confidence intervals (e.g., 99.9% intervals, intervals that range from anchor points of "astonishingly low" to "astonishingly high," even intervals ranging from "minimum value" to "maximum value"), offering financial incentives (direct payoffs or

the freedom to wager with highly favorable odds), and staking students' midterm exam grades on their calibration. Overconfidence appears to be the rule, not the exception, in our judgment. Thus far most proposals for "debiasing" it have failed empirical tests. In addition to questioning the validity of a challenge to the appropriateness of one's own confidence levels, I would urge readers to routinely consider how warranted their own confidence truly is, and I refer them to my original article for the methods of reducing overconfidence that are most strongly supported by empirical research.

Anything Goes with Supernatural

In his Forum article "From the Anthropic Principle to the Supernatural," (November/December) David A. Shotwell hit the nail on the head with the statement, "If you admit the supernatural into your calculations, anything goes." I've been using almost those exact words in an ongoing debate with a friend who doesn't believe in psychics, ESP, or in the supernatural at all unless you're discussing the Bible. Repeatedly I've asked him, If all those miracles occurred, then why isn't it possible for supernatural events to happen today? His response is that his faith is how he knows the Bible is accurate.

I've had arguments along the same lines with many other people as well, and I have learned this much: Those who believe in creationism and the Red Sea parting will never be swayed by reason or evidence. So now when I feel the urge to argue, I think, Why bother?

Shawn Watson
Amarillo, Texas

Internal Coding Systems?

As a physicist and an engineer who has made significant contributions to the practice of data transmission I agree wholeheartedly with Professor Krauss "May the Force Be With You," (November/December 1998) that there is no plausible physical mechanism that could account for telepathy. However, ever since carrying out card-guessing experiments in my teens, I have been concerned about a deeper problem. Even given that we could transmit "thought waves" from brain to brain, is there any reason to suppose that any two human beings use the same internal coding system?

As a child I learned to do some of my thinking in English but much of it is apparently done in visual terms or in terms of equations and schematic diagrams. Suppose I am looking at a red card. Am I transmitting the word "red," the concept of "redness" or simply the neural firing pattern which, in my brain, represents either the word or the concept? Would someone receiving my thought waves interpret them as "red" or would that pattern be their internal code for "gorilla" or, more likely, "qaxtlnffz." For that matter, would someone who spoke only French receive "rouge"?

Considering the problems computer users have with incompatible processors, operating systems, and data files, I would like to see someone address the question of whether our brains all use the same hardware and software. If they don't, then telepathy becomes even less probable. (On the other hand, the communication problem between skeptics and believers becomes easier to understand. We simply use different operating systems.)

Tom Napier
North Wales, Pa.

Orson Welles is Going to be Sorry He Missed Y2K

Re: "Martian Panic" November/December 1998: There is not much disagreement about how unprepared computer systems are for the changing of the century numeral, but *many people are stockpiling water, canned* goods, and weapons. It's always a good idea to have a survival kit of food, water, and medical supplies for earthquakes and other natural disasters. But why do people think that a computer date miscalculation is going to affect their water supply? Grocery suppliers may not have "just-in-time" forecasts of which stores need the most diet cola, but no one is going to starve. I believe that more destruction will result from hysteria than from computer miscalculations.

The computer problems will be resolved. Not as rapidly or as fairly as we'd like, but they'll be handled. What will be much harder to deal with will be the panic that the ordinary citizen feels from such imagined concerns as looters swarming across the borders when the immigration monitoring systems go down.

Given the misinformation about how Y2K will result in Armageddon, I encourage CSICOP to become active in publishing information about Y2K. Perhaps you'll uncover something that will send us to the hills after Mr. Yourdan. But I'm guessing that you'll find we need to be dealing with misinformed users just as hurriedly as the computers.

Steve Walton
Concord, Calif.

Temple's Center for Frontier Sciences: More Reaction

The following two letters continue the responses to Martin Gardner's column "What's Going On At Temple University?" (September/October 1998) from people involved with Temple's Center for Frontier Sciences and its publication Frontier Perspectives. *Gardner's reply follows them. Previous responses and brief replies from Gardner plus comments from other readers appeared in our January/February 1999 issue (pp. 65–67). For other published reaction see Articles of Note, this issue and last.*

—The Editor

Martin Gardner trades on his good name as long-time author of the entertaining *Scientific American* confection "Mathematical Games," but clearly not on his ability to read with comprehension. I am referring specifically to my article in *Frontier Perspectives,* the subject of his recent rant "What's Going On At Temple University?" I do have the gratification of acknowledging that he learned something from the article, that is, the word "nosology"—a system of classifying symptoms, signs or diseases ("rhinology" would be the study of noses, wouldn't it?). This is a perfectly ordinary word found in nontechnical dictionaries. Perhaps this is an example of what Mr. Gardner deems "mind-numbing technical jargon." He states that my article "defends the thousands of herbal remedies sold in Oriental shops," but I did not "mention the shops in India." What? *Which* article is this? What's all this about shops? Or *defending* them?

Mr. Gardner takes this profound knowledge of clinical science to emit a blast of scorn directed at homeopathy. Homeopathy, as a matter of historical record, became popular in Europe because of its efficacy during a cholera epidemic in Germany and likewise in America during a yellow fever epidemic. It was not embraced because it sounded like it was based on a good theory. On a similar note, during the encephalitis epidemic in Japan in the 1950s, a widely used herbal

combination reputed effective for high fevers was spurned by medical "authorities" because the antifebrile effect of this formula was considered impossible for purely theoretical reasons. To examine historical practices including dowsing, homeopathy, or phytotherapy (no, Mr. Gardner, it's not a martial art) unbiased by nineteenth century reductionism is an important part of the scientific frontier. Mr. Gardner suggests that we should turn our attention instead to such stark nonsense as the "genetic origins of altruism" or "speculations about a 'multiverse' in which endless universes . . . explode into reality." Huh? (Does that sound like Tibetan frontier science?). . . .

I would like to summarize my article in *Frontier Perspectives* for those who may not be inspired to read it after reading Mr. Gardner's diatribe. The article explains that when botanical medicine is professionalized in industrialized societies, e.g., Japan, France, Germany, etc. in order to be effective, doctors preferentially rely on the clinical techniques of thorough history-taking and physical examination rather than laboratory parameters (although laboratory-based diagnostic methods are not discarded). That's it. There are no incense-filled rooms or mystical incantations in this article. No "shops." Those are only in the careless reader's imagination.

Dan Kenner
Santa Rosa, Calif.

"Is dead matter aware of its environment?" I asked this question in *Frontier Perspectives.* My paper was reviewed in the SKEPTICAL INQUIRER. The reviewer seemed to know the answer. Newton was baffled by it, but recognized that remote matter particle interactions could explain the fall of the apple, the rise of the tides, and the orbits of the planets. Einstein thought action at a distance was "spooky" and formulated what has become known as Einstein's local action principle. With it he developed his relativity theories.

In the face of mounting experimental evidence favoring non-local actions, Einstein accepted, in the last ten years of his life, that he was wrong. To me the honesty of this great mind in admitting the failure of his life's work is truly humbling. . . .

My thesis was dismissed by Martin Gardner with a single comment: "He thinks Newton's physics is superior to Einstein's." Nonsense, of course. Gardner knows a parascientist when he sees one and does not need to check up on him. In case skeptical inquirers are interested, he could have explained my case with the following few sentences.

Since 1820, the birth of electrodynamics, a series of experiments have come to light which all prove that the Lorentz force is flawed. This force is the electromagnetic embodiment of Einstein local action. Therefore the special theory of relativity must also be flawed. One of the many experiments which contradict this theory is the operation of the induction motor. Perhaps a million of these motors, running all over the world, prove that it is action at a distance between metal atoms, across an air gap, which makes them pound away day-in and day-out.

I do understand that in the flood of scientific information raining down on our heads, Martin Gardner could have missed some 100 papers disproving the Lorentz force. As a widely published science writer I would, however, have expected him to have come across one of our three books on this subject. Incidentally, in [my book *Newton versus Einstein*], which was referenced in *Frontier Perspectives,* he would have read:

> This event (Galileo's Leaning Tower of Pisa experiment) is commemorated by a plaque on the tower, but historians doubt it has taken place. We can rest assured, however, that Galileo confirmed his thesis by dropping objects from high places.

Peter Graneau
Concord, Mass.

Martin Gardner replies:

It's not easy to have rational dialogue with someone who believes, as does Dan Kenner, in the efficacy of homeopathic drugs and dowsing. I couldn't find "phytotherapy" in my Webster's College Dictionary, but I assume it means plant therapy. Kenner's use of this term is a fine example of obfuscatory jargon. To dismiss as "nonsense" the many recent books on the genetic origin of altruism (I recommend Unto Others: The Evolution and Psychology of Unselfish Behavior, *by Elliott Sober and David Sloan, just published by Harvard University Press) is another indication of Kenner's bizarre beliefs. As for "shops," I meant the tens of thousands of shops in Japan, China, and India that sell thousands of herbal remedies (they differ from country to country) for every every conceivable ailment including cataracts and venereal diseases.*

Peter Graneau belongs to a tiny group of maverick physicists who think that relativity, now confirmed to the hilt, is deeply flawed. He is convinced it is refuted by every electrical motor in the world! Newtonian Dynamics, *by Peter and Neal Graneau, is a vigorous attack on Einstein.* Newtonian Electrodynamics, *also by the Graneaus, is a similar effort to apply Newtonian theory to electrical phenomena. The title of a third book by the Graneaus,* Newton versus Einstein, *says it all. In the paper I criticized, Peter Graneau writes, "It should be clear that nature has spoken, and as far as her remarks go, recommends the Newtonian world views."*

I am pleased to learn that elsewhere Graneau recognized that Galileo's Tower of Pisa experiment is a myth. Why then does he write in his article that the "blindness" of those who defend relativity theory is "synonymous" with the blindness "displayed by the professors of the University of Pisa when they saw Galileo's cannonball and the light musket ball fall with the same velocity from the leaning tower"? Did Graneau forget what he said earlier?

Beware of the scientists who liken themselves to Galileo and their antagonists to the professors of Pisa.

Sparks Responds on Media Experiments

In Richard Brandshaft's comments (Letters to the Editor, November/December 1998) on my experiments about media impact on paranormal beliefs (July/August 1998), he raises a question about the extent to which subjects in these experiments respond according to their perceptions of what the "experimenter is after." This issue (known as the problem of experimental demand characteristics) is a crucial concern for any experiments done with human subjects and it occupies an important place in any standard course on experimental methods. In fact, a good experimenter assumes that this type of effect might *always* threaten the validity of experimental results. Consequently, many steps are taken in the experimental design and data collection phase to help eliminate the possibility that this sort of effect might explain the results of the study. In the original publications that I summarized, I show how these steps were carefully followed and I discuss the reasons for doubting that experimental demands explain the results. Experiments for which there is a significant level of doubt about the possibility of this kind of effect would usually have a difficult time passing peer review for publication. The care that is typically exercised on this issue in published experiments stands in sharp con-

trast to Brandshaft's comment that, "It seems to be an article of faith among people who do these experiments that [these response effects] are small." Quite the contrary. Good experimenters are nearly obsessed with providing strong logical reasons and sound empirical data to rule out these effects as rival explanations for their results.

Having said this, I am always skeptical of any single experimental result and seek to replicate it using different procedures and designs. As I noted in my article, I regard the status of the current research conclusions to be tentative. The research is just beginning and there are many more studies to be done.

Finally, regarding the phone survey that I reported, Mr. Brandshaft's caution about interpreting correlations as evidence for causality was one that I noted at the outset of my comments on the survey. I also discussed his notion that paranormal beliefs might determine exposure instead of the other way around. This is certainly a plausible interpretation of the survey results. I would also add that this possibility does not preclude the notion that exposure helps determine beliefs. Such bi-directional relationships have been uncovered in other research on media effects. It would not be particularly surprising to find one in this domain as well.

Glenn G. Sparks
Professor of Communication
Purdue University
West Lafayette, Ind.

Which One of You Is That?

I was discussing your book review on multiple personality disorder with myself (Lilienfeld, November/December 1998) and was bothered by the emphasis on its being a disorder. Multiple personalities are fun and useful. One need never be lonely, and multiple personalities provide flexibility of response to diverse situations. My kids would find me dull if sometimes I wasn't Dactyl, Rhamphorynchus extraordinaire. I don't even think I would have kids if my wife hadn't been attracted to a crazy dancer. The readers can fill in some of the other personalities which have kept the relationship going over twenty years.

It's not a disorder to have distinct modes of response (states, roles, alters) or personalities. It is a disorder if the person has no control over which personality is dominant at any given time, if some of the personalities are dysfunctional, or if there is no shared awareness. I don't know how anyone can count, let alone distinguish, 4,500 alters, but the concept in a less extreme form isn't hard to believe. The problem is with crazy so-called psychiatrists who have blurred the definition of personality, inflated the significance of altered states (or is that LSD?), and convinced gullible people that it is the root of their problems. Dactyl agrees.

Robert Clear
Rhamphorynchus Society
Berkeley, Calif.

Journal of Scientific Exploration

In his News and Comment article (September/October 1998) Robert Sheaffer was, I believe, a little too scathing of the *Journal of Scientific Exploration*. However I agree with much of what he wrote, in particular the evident paucity of skeptical input to the *Society for Scientific Exploration's* UFO panel.

While some of the content of the *JSE* upsets me as a long-time skeptic (and founder of a lively skeptics group with now almost 100 members), I still consider that the journal fills a gap between the mainstream science journals and the wacky magazines that print every piece of nonsense they lay eyes on. The *JSE* is run by reputable academics, and the papers they publish are reviewed. The proper course for Sheaffer, or any other skeptic who wishes to challenge anything the *JSE* publishes, is to respond seriously and present counter evidence as one would with any mainstream scientific journal. I feel sure such a response would be accepted and published by the *JSE* editor. . . .

Colin Keay
New Lambton, N.S.W.
Australia

Tolstoy Did It

That "Leo Tolstoy is the Supreme Being who created the universe," as proposed (perhaps not seriously) by David E. Thomas ("Tolstoy predicts Bulls' Sixth Championship [In Code Of Course]," News and Comment November/December 1998), was anticipated by a century or more, as implied by a definition in Ambrose Bierce's *Devil's Dictionary*.

NIHILIST, *n.* A Russian who denies the existence of anything but Tolstoi [sic]. The leader of the school is Tolstoi [sic].

David Hawkins
Brooklyn, N.Y.

What Atheism Holds

Robert J. Schier's letter (November/December) is badly confused about what atheism holds. Schier claims that "Debating the fundamental philosophical issues concerning God is futile; neither theism or atheism can be proved or disproved." Schier's false assumption is that atheism is a statement that there is no god. 'Tain't so. All atheism says is the simple and obvious fact that there is no evidence for the existence of supernatural beings, whether they be gods or tooth fairies.

Schier is correct in his assertion that the existence of such beings cannot be disproved. Trying to disprove the existence of a supernatural being would indeed be a futile exercise. That's why rational people long ago agreed on the two principles of reasoned argument: First, that the burden of proof is on the affirmative, and second, that extraordinary claims require extraordinary evidence.

So the burden of proof rests with Schier to prove the existence of his Christian god or any other. The world eagerly awaits his extraordinary evidence for his extraordinary claim.

Brian Templeton
Des Moines, Wash.

Arguments About Astrology

I read with sympathy Judith Hayes' article on how to address astrology with believing friends (September/October 1998). As an astronomy amateur and divulgator, I have talked many times about this topic in the media, giving lectures and with my own friends. I think there are even stronger reasons you can give against the astrological nonsense:

1) The constellations *do not exist*. They are the fabrication of particular places and times: each culture "creates" its own sky. For historical reasons, our Western civilization inherited the Greek "signs," but seventeenth century navigators created constellations with names like Chemical Furnace, Telescope, and Pneumatic Machine in the Southern Hemisphere.

Ask your friend to look upwards tonight: Where are the bull, the bears or the twins?

Show him or her how ridiculous it is to give those names to arbitrary groupings of bodies, which have no direct relationship between them. Then explain the real wonders that exist in Orion, in the Pleiades, in Ursa Major.

2) Tell him or her that, in astrology, distance isn't important: Mars has the same "influence" when it traverses a sign, no matter if it's at its minimum or maximum distance from our planet. And if distance doesn't matter, where are Titan or Ganymede in the astrological charts? These moons and others are bigger than the planet Mercury.

By now, you have made an important point: for astrology only *apparent* movements are considered. Earth is still at the center of the universe.

3) If you were on Mars, what would be the "influences" of Earth and Mars on you? I've seen more than one astrologer speechless at this question.

4) Ask your friend: By which force or mechanism do stars and planets "influence" us? On all known forces distance is fundamental, and measurable interactions have to be present. Most probably the answer you'll get will be: "It's a force or mechanism yet unknown to science." Then you got it. Because, by definition, nobody can make predictions using *unknown* data.

Sami Rozenbaum
Caracas, Venezuela

The XF11 Asteroid Affair

I am sorry that two columns of the November/December 1998 issue were given to a letter that is substantially wrong about the 1997 XF11 matter. In it, Louis Strous defends Brian Marsden's inexcusable announcement last March concerning a possible impact with Earth in 2028. He argues that Marsden was only doing his job by using the *IAU Circulars* to obtain more positional observations of the asteroid (he calls it "clearly a case where more observations were needed") and he blames journalists for misunderstanding uncertainties, misusing the *Circulars,* and hyping the prospective near miss. Strous is wrong on all counts.

The simple fact is that new observations of 1997 XF11 were *not* needed in March. As shown in two papers (one by Karri Muinonen of the University of Helsinki, the other by Paul Chodas of J.P.L.) presented at the October 1998 meeting of the Division for Planetary Sciences of the American Astronomical Society (abstracts published in Vol. 30, Number 3, of the *Bulletin of the American Astronomical Society*), more than sufficient observations were already available late the previous December, and certainly by January, to conclusively rule out an impact in 2028. Muinonen, for example, finds the formal probability of impact to be $\sim 10^{-42}$ based on observations through December 22 and by February 4 (more than a month before Marsden's announcement) to be $\sim 10^{-966}$. Since any impact probability less than $\sim 10^{-7}$ during the next century makes an asteroid more nearly "certifiably safe" than "potentially dangerous," clearly Marsden's conclusion that the 2028 approach was noteworthy because the asteroid's "chance of an actual collision is small, but one is not entirely out of the question" was dead wrong.

No more observations were needed by March, so Marsden's *IAU Circular* was simply not necessary. What was needed was for Marsden to learn how to make correct impact probability calculations (he has since admitted that his were faulty, which is why the miss distance in 2028 will be more than twice the distance to the Moon despite Marsden's words that the asteroid was "virtually certain" to pass closer than the Moon) and to check with his colleagues before going public with such dramatic news. Another thing that would have avoided the needless March scare would have been proper organization of the handling of asteroid data by the IAU, NASA, and other entities so that calculations, like those later done by Muinonen and Chodas, could have been done in January as soon as the data were available.

While Strous correctly describes the initial purposes of the *IAU Circulars* (to inform astronomers about needed observations), modern communications have made reliance on the original protocols obsolete. For years, Marsden has been fully aware that major newspapers (such as *The New York Times)* subscribe to the *Circulars.* It is for just that reason that Marsden had already written an accompanying "Press Information Sheet" at the time he issued the *Circular.* Within an hour of posting the *Circular,* the press officer of the American Astronomical Society had distributed Marsden's "PIS" far and wide. (The "PIS" contains Marsden's faulty words about a "small" chance of impact as well as other faulty information, such as the claim that 1997 XF11 would make a "splendid sight" in the skies over Europe.) Strous can hardly blame journalists for acting on such a press release distributed by such supposedly reliable organizations as the IAU Minor Planet Center and the American Astronomical Society.

I have fully documented the 1997 XF11 affair in a draft "case study" prepared for a project called "Prediction in the Earth Sciences: Use and Misuse in Policy Making" (organized by the Geological Society of America and the National Center for Atmospheric Research). It may be found at: www.boulder.swri.edu/clark/ncar.html.

Clark R. Chapman
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Biorhythm Review Reprint

Thank you for noting my article "Comprehensive Review of Biorhythm Theory" in the September/October issue (Articles of Note). I will be happy to send a reprint of this 45-page article to any SI reader who would like one. I can be contacted at the address below or by e-mail at: thines@fsmail.pace.edu.

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For the Record

Heidelberg has not flipped, but our photo was. The photograph of Heidelberg leading off coverage of the Second World Skeptics Congress (November/December 1998) got flipped left-to-right in the final stages of production at the printer. We're sorry if anyone suffered permanent disorientation! In the printed version of a letter signed by 14 leading skeptics under the heading "Science, Religion, and Believing in Weird Things" (Letters to the Editor, January/February 1999, pp. 62, 64), a phrase in the last sentence referring to "logical skeptical groups" was a typographical error. It should have said "local skeptical groups."

—Editor

The letters column is a forum for views on matters raised in previous issues. Letters should be no more than 225 words. Due to the volume of letters not all can be published. Letters should be addressed to Letters to the Editor, SKEPTICAL INQUIRER, and sent by mail (preferred) to 944 Deer Dr. NE, Albuquerque, NM 87122; by fax to 505-828-2080; or by e-mail to letters@csicop.org.

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On this page in the January/February 1999 issue we presented a new Hubble Space Telescope (HST) deep-field view of more than 300 of the faintest galaxies ever seen in the universe, in a pencil-beam-wide patch of sky near the Big Dipper in the Northern Hemisphere.

Here now is a new, complementary HST view down a similarly soda-straw-narrow twelve-billion-light-year-long corridor in the Southern Hemisphere skies, near the south celestial pole. It shows a dazzling assortment of thousands of never-before-seen galaxies. The image doubles the number of far-flung galaxies available to astronomers for deciphering the history of the universe. The ten-day-long observation was carried out in October 1998 and issued by NASA on November 23, 1998.

Credit: Robert Williams (Space Telescope Science Institute), the Hubble Deep Field-South Team, and NASA.

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". . . to promote and defend reason, science, and freedom of inquiry in all areas of human endeavor."

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THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION OF CLAIMS OF THE PARANORMAL

The Committee for the Scientific Investigation of Claims of the Paranormal encourages the critical investigation of paranormal and fringe-science claims from a responsible, scientific point of view and disseminates factual information about the results of such inquiries to the scientific community, the media, and the public. It also promotes science and scientific inquiry, critical thinking, science education, and the use of reason in examining important issues. To carry out these objectives the Committee:

- Sponsors publications
- Conducts public outreach efforts
- Maintains an international network of people and groups interested in critically examining paranormal, fringe-science, and other claims, and in contributing to consumer education
- Encourages research by objective and impartial inquiry in areas where it is needed
- Convenes conferences and meetings
- Conducts educational programs at all age levels
- Does not reject claims on a priori grounds, antecedent to inquiry, but examines them objectively and carefully

The Committee is a nonprofit scientific and educational organization. *The Skeptical Inquirer is its official journal.*

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